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MONTANA OUTDOORS

OUR POINT OF VIEW

MICHAEL H. FRANCIS

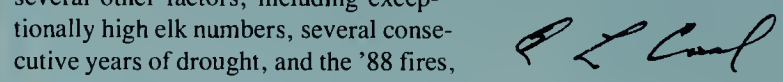
THE DRAMATIC FIRES OF 1988, followed within six months by the loss to starvation of a major portion of the northern Yellowstone elk herd, placed more national media attention on Yellowstone National Park than at any time in recent memory.

Both were natural events and important lessons in ecology. Just as fire has historically played an integral role in Yellowstone's ecosystem, wildlife losses during winter, though seldom of the extent witnessed with the northern Yellowstone elk herd, play an important role in the ecology of all northern big game populations. When an ecosystem is out of balance, whether brought about through decades of protection from fire or policies that allow a big game population to outgrow its habitat, Mother Nature will step in to set things right.

While the intensity of the fires of '88 could never have been foreseen, we had known for some time that the amount of winter range in Montana used by the growing number of elk in the northern herd would be inadequate if a hard winter were to strike. Although the winter of 1989 was no more severe than normal, several other factors, including exceptionally high elk numbers, several consecutive years of drought, and the '88 fires, combined to produce the predicted result—loss of elk from the herd.

Two articles in this issue of *Montana Outdoors* deal extensively with the winterkill situation along the northern border of the park last winter and efforts that are now under way to secure more winter habitat in Montana for the migratory portion of the northern Yellowstone herd. Although losses of big game animals during winter will always be a fact as well as a necessary part of the ecological equation in Montana, providing additional winter range for elk in the northern herd will help solve some of the most pressing problems now surrounding the effective management of this nationally renowned herd.

Governor Stan Stephens and Montana's congressional delegation have taken the lead in supporting this important habitat acquisition effort. In conjunction, this department, the U.S. Forest Service, the National Park Service, the Rocky Mountain Elk Foundation, and many private individuals are working cooperatively to see this effort through to fruition. In the end, all those who take pleasure in observing this living legacy, or simply in knowing it exists, will be the beneficiaries. But more important, so will a special herd of elk that Montana, Yellowstone, and all Americans share.



K.L. Cool
Director
Montana Department of Fish, Wildlife & Parks

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Front Cover—Our front cover shows detail from "Hidden Prey—Bobcat" by **Jorge Mayol** (© 1987). It appears here courtesy of the artist and Mill Pond Press, Inc.; Venice, FL 34292. Mill Pond Press has published a limited edition print of this image; it costs $95, and information about local dealers is available by calling 800/237-2233.

Back Cover—It used to be called "bronze ibis" or "black curlew." **Jan L. Wassink**'s back cover photo of a white-faced ibis shows why those "old" names might have been used.

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WINTERKILL

PETE & ALICE BENGEYFIELD

by Tom Lemke

IT WAS ALMOST NOON on a warm, sunny February day. I was hiking in elk winter range in the Bear Creek drainage near Gardiner, Montana. In the last couple of hours, I had grown complacent as I counted elk carcasses, pulled teeth, sampled bone marrow, and filled out "obituary" forms.

The next carcass was an adult cow; like many others, it was lying under a juniper tree. As I approached from the downhill side to less than three feet away, the cow slowly raised her head. She was too weak to stand, and fluid drained from her nose and mouth. We looked at each other at close range. Her eyes reflected excitement and fright, but she could not stand up, let alone run away.

What do you do? How does one react as human emotions come into play? Seeing large numbers of dead and dying animals is an unforgettable and very unpleasant experience. Many people in Montana and across the country were dealing with these same feelings in early 1989 as significant elk winterkill was under way inside and adjacent to Yellowstone National Park.

Public concern

As a Department of Fish, Wildlife & Parks (FW&P) biologist stationed in

Livingston, about 50 miles north of the park, every day I was barraged with questions from concerned individuals and reporters. How many elk have died? How many live elk did you count? How many will survive? When will it be over? What can be done to help? Starvation and winterkill received media coverage from New York City to Honolulu, Hawaii. An emotional nerve had been touched, and many people were angry. There were more questions than answers during those difficult days.

As I looked at the elk dying in Bear Creek, I couldn't help but compare that scene where dozens of rotting elk littered the hills with the much happier atmosphere only a week before at the Gardiner check station where hunters streamed through, transporting field-dressed elk to their homes. At the check station, there were colorful stories of successful hunts and the promise of full freezers. During the Gardiner late-season elk hunt, 2,352 successful hunters—ranging in age from 12 to over 70—took home meat and fond memories. Special measures had been taken by FW&P to harvest additional animals that were not expected to survive the winter. Hunters understood firsthand that many of the elk they had seen during their hunt were destined to starve.

Major winterkills do not occur regularly in Montana. When they happen, particularly with elk, people become emotional and at times outraged. In the rare years of large winterkills, we need to re-examine the facts to learn what has happened, why it has happened, and how it may affect future wildlife populations. Following the winter of 1988-89 is a good time to sort out hard biological facts and try to deal with our emotions.

"Although large die-offs are not desirable from a wildlife management standpoint, winterkill is a critical and necessary part of population ecology. It is the natural way out for many animals that are most susceptible to death."

MICHAEL H. FRANCIS

Winterkill

Starvation is prolonged food deprivation that leads to death. Before death, animals enter a state of malnutrition. During this time they are either ineffective or deficient in obtaining, digesting, and utilizing food. Symptoms of malnutrition include weight loss, increased prominence of bones, a listless appearance, and an unkempt coat. Before death, animals may lose as much as 30%-40% of their normal body weight.

Starvation in big game animals is a major cause of natural mortality. It typically occurs during seasonal shortages of food, which in Montana means winter and early spring when energy demands to maintain body temperature are high and food resources are low.

Although large die-offs are not desirable from a wildlife management standpoint, winterkill is a critical and necessary part of population ecology. It is the natural way out for many animals that are most susceptible to death. Natural mortality creates room in the environment for stronger members of the same species and provides food and life for other species that scavenge for food. In nature, death is the only way to recycle nutrients and minerals that support life. From a human perspective, winterkill is often referred to as a loss of animals and something to be avoided. However, in the context of an ecosystem, nothing is really lost, only transformed into other life forms.

The winterkill survey

Early field experience near Gardiner in the winter of 1989 indicated that many animals were dying in or near stream bottom cover where they attempted to find food or sheltered bedding areas. Taking advantage of this fact, a sampling scheme was devised to

document the extent of the winterkill, the distribution of dead elk, and the age and sex of the animals most affected. Each major tributary of the Yellowstone River from just inside the park boundary to 16 miles downstream at Yankee Jim Canyon and Dome Mountain Wildlife Management Area (WMA) was sampled. Numerous student volunteers as well as FW&P and U.S. Forest Service employees walked predetermined stream bottom transects from February to June.

For each dead big game animal, we recorded the date, location, species, sex, age class, physical condition, and evidence of scavenging, both animal and human (since elk antlers and teeth have a relatively high market value, they are avidly sought by many people). Survey workers took bone marrow samples and teeth from several carcasses to determine relative fat reserves and exact ages of the animals. All carcasses visible from the stream bottom routes were examined and marked. Relative densities of dead elk were expressed as carcasses discovered per mile of transect walked. Several transects were surveyed more than once. Carcasses located away from stream bottoms were counted from a helicopter during game surveys in April and May.

Survey results

What did we learn about winterkill? Based on our sample of 545 dead elk (390 ground samples and 155 observed from the air) and 72 other winter-killed big game animals along the northern boundary of Yellowstone Park, we can say the following:

1. All ungulates were affected to some degree. We found dead elk, mule deer, antelope, bison, and bighorn sheep. Elk were by far the most numerous animals present and died in the highest numbers.
2. Although no sex or age class was totally immune from winter mortality, young and old animals were hit hardest (see Figure 1). From a ground sample of 390 elk, 176 (45%) were calves, 128 (33%) were cows, 83 (21%) were bulls, and 3 (1%) were unidentified. Of the 319 elk that were aged, 266 (83%) were either younger than 2 years or older than 8 years.
3. Of the 56 bulls of known age examined, 48% were yearlings or 2-year-olds, 36% were prime-aged (3-8 years), and 16% were older animals. Of the 87 cows of known age, 28% were yearlings or 2-year-olds, 33% were prime-aged, and 39% were older animals.
4. Most of the winterkill occurred during a relatively short but critical period of stress, from about February 10 to March 1. During this period, extremely cold temperatures, deep snow, and bitter winds combined to push many elk over the edge at the same

LARRY MAYER

RALEIGH MEADE

Dead elk were commonly found in small groups along wooded stream bottoms where they attempted to find food and shelter. By early summer, carcasses had been heavily used by coyotes and birds, and a few had been eaten by bears.

time.

5. Most of the dead elk were found in the lower reaches of the drainages surveyed. Many carcasses were found on south-facing slopes or in creek bottoms at elevations between 5,400 and 6,800 feet. Dead elk were commonly found in groups of four to eight animals in a small area.

6. Mule deer fawns were also hit hard by winter mortality. Thirty-nine of 61 dead deer (64%) examined were fawns. Spring helicopter surveys indicated survival rates of 14 fawns/100 adult mule deer compared with 44-47 fawns/100 adults in recent years.

7. Before March 20, fewer than 15% of the carcasses had been fed on noticeably by animal scavengers. By May and June, however, carcasses had been heavily used by coyotes and birds, and a few had been consumed by bears.

8. Elk antler and tooth collectors were quite efficient at their work. More than 75% of the antlered elk sampled had had their antlers or "ivories" (canine teeth) removed by people.

Figure 1 — 1989 elk winterkill statistics

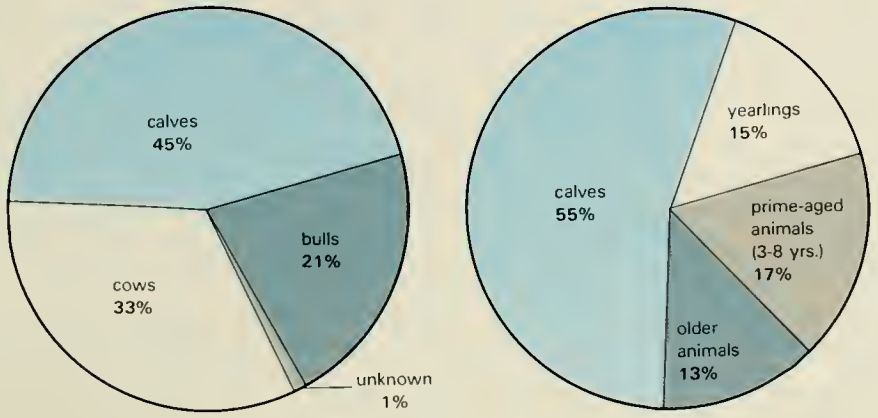


Figure 2 — Distribution of elk carcasses in the study area (numbers are dead elk per mile of transect)

Winterkill distribution

Surveys covering 46 miles of transects in 16 drainages showed the highest densities of elk carcasses just inside or immediately adjacent to the Yellowstone Park boundary (see Figure 2). The number of carcasses decreased north of the park, even though large numbers of elk wintered there. Densities ranged from over 20 elk/mile of transect in Bear, Palmer, and Phelps creeks to one or fewer dead elk/mile on the Dome Mountain WMA and in Cedar, Slip and Slide, and Mulherin creeks. Elk counts in January and April showed that at least 3,000 to 4,000 elk wintered from Dome Mountain WMA to Cedar Creek with relatively little mortality.

High winterkill losses near the park boundary were probably the result of the following factors: (1) Forage production and availability inside the park and on the boundary line winter range was lower than outside the park due to drought conditions and record numbers of elk, deer, and bison in the park in recent years. (2) Elk arrived on the winter range in the fall of 1988 several weeks earlier than usual, probably due to drought conditions and forest fires; this concentrated elk in the boundary line area for a much longer time than usual. (3) During the migration, thousands of elk all used this area as they moved north from September to March.

As winter progressed, range conditions deteriorated rapidly inside and near the park boundary. Elk that did not move north fell on extremely hard times. It appears that elk migrating eight miles or more north of the park were rewarded with better feed and higher survival.

Population impacts

No one will ever know for sure how many elk died in and adjacent to Yellowstone Park in the winter of 1989. Including data from surveys done inside the park, a minimum of 1,500 elk carcasses were found on the winter range and many more were viewed from the air. Long-time residents of Gardiner believe this was the most severe winterkill in 20 years or more. The National Park Service estimates that 4,400 to 5,500 elk, or 24%-27% of the northern Yellowstone elk herd, died as a result of winterkill. This population model is still being refined and its accuracy has not been completely validated.

Winter mortality removed a huge portion of a single age class (calves) from the elk population. In April, aerial surveys revealed calf/cow ratios of only four to six calves/100 cows inside the park, while there were 14 calves/100 cows outside the park. In recent years, calf/cow ratios have been 19-22 calves/100 cows in the park and 30-40 calves/100 cows outside the park. A stressful winter on pregnant cows may also have a negative effect on the following spring's calf crop. Early data indicated that the 1989 calf crop inside the park was very low compared with previous years.

Looking at prime-aged breeding animals—the largest and most important segment of the elk population—prospects appear much brighter. Only 53 (17%) of the carcasses examined were prime-aged, or 3- to 8-year-old animals. Survival of large numbers of prime-aged cows is probably the most important factor in subsequent population recovery.

Wildlife populations are not stable; they are dynamic, going up or down as conditions around them change. Elk die every winter in Yellowstone, and significant winterkills have been noted in park records 11 times between 1880 and 1962. Following several of these hard winters, the elk population declined to much lower numbers than exist today. From the survivors of the winter of 1988-89 will come the future elk herds of the Yellowstone. This outstanding resource will certainly recover as it has in the past.■

COOPERATIVE SOLUTIONS

Winterkill is nature's way of removing the least vigorous animals from big game populations in all northern climates. It varies from year to year and place to place, depending primarily on weather severity and food availability. It is not a serious problem in most of Montana's elk herds, where animal numbers are in balance with available habitat. The major loss of elk from the northern Yellowstone herd during winter and spring of 1989 was due in part to deteriorated range conditions inside the park and immediately north of the park boundary in Montana, and in part to a large build-up of animals in this herd. Fortunately, thanks to a hallmark level of cooperation among several public agencies, private organizations, and concerned citizens, an intensive effort is under way to obtain and protect critical winter habitat for the northern Yellowstone herd. The goal is to provide healthy winter range outside the park managed specifically for elk.

- The Montana Fish and Game Commission early last March adopted a position against feeding starving elk in the northern Yellowstone herd, and urged instead that the long-term habitat needs of the herd be addressed.
- The 1989 Montana Legislature passed a resolution directing the Department of Fish, Wildlife & Parks (FW&P) to cooperate with other agencies in seeking a solution to current problems and in providing additional habitat for the long-term benefit of the northern Yellowstone herd.
- The Rocky Mountain Elk Foundation, FW&P, U.S. Forest Service, and National Park Service identified several key wintering areas that might be acquired and signed a Memorandum of Understanding late last winter agreeing that securing the necessary funding should be a top priority.
- Governor Stan Stephens, in a letter hand-delivered to President George Bush in June, requested federal assistance in securing funds for the effort and offered to commit up to $2 million in FW&P funds if additional federal funding could be obtained.
- Members of Montana's congressional delegation have suppported the effort and requests for federal funding.
- FW&P produced a report, "Preserving a Legacy," which outlines the need for action in acquiring additional winter habitat for the northern Yellowstone herd. This report, which includes letters from Governor Stephens, Montana's congressional delegation, the Rocky Mountain Elk Foundation, and others, has been sent to members of Congress, major news organizations, and several prominent outdoor news outlets.
- FW&P Director K.L. Cool traveled with representatives of the Rocky Mountain Elk Foundation to Washington, D.C., in July to meet with Montana's congressional delegation and other members of Congress concerning the governor's request for federal funding.
- The Rocky Mountain Elk Foundation signed options to purchase two properties previously identified as critical winter habitat for the northern Yellowstone herd.
- In August, U.S. Representative Pat Williams and Governor Stephens toured the two properties on which the options have been secured. CNN covered the tour and meeting throughout the day on Sunday, August 20, and the tour received extensive coverage by other news media.
- Also in August, the National Fish and Wildlife Foundation established a $300,000 multi-year challenge grant in support of the habitat acquisition effort.—*William Phippen, Helena information officer*

The Right Place, The Right Time

TOM WARREN

When Montana's Wildlife Restoration Program began in the 1940s, the department's official goal was "to provide hunting of all species in every suitable bit of habitat...with due consideration to aesthetic values." Three of the men involved in accomplishing this task gathered recently to reminisce: Pictured from left to right are Bob Cooney, Rex Smart, and Jim McLucas.

by Tom Palmer

I HAVE BEEN PROMISING MY YOUNG SON that we would wake up before dawn, go over to Black Mountain, and listen for bugling elk. He has just turned 4, and he is eager to hear their haunting call.

Together we have seen mountain goats on the Missouri River cliffs Lewis and Clark called Gates of the Mountains, and we often spot antelope on the Townsend Flats. On many evenings, we've seen deer feeding on the grassy hills above Ten Mile Creek. When we are out and I experience the wildlife through my son's awe, there are times when I think I understand how Chief Arapooish felt when he said the Crows were living exactly in the right place, a place where everything good could be found.

There is great irony in these emotions and the fact that my boy has been born in the midst of this abundance. We live in town—in Helena, Montana's capital. Yet we can be in the thick of things in a matter of minutes. Like so many other places in Montana, archaeologists know this area has nurtured a diversity of wildlife for eons. More contemporary evidence, found in 19th century journals and turn-of-the-century diaries and letters, shows that Montana's wildlife tradition prospered through the ages.

It's difficult to imagine Montana without great numbers of wildlife, but just 50 years ago Montana was a very different place. For a variety of reasons, game populations had been spent, and in many areas deer, elk, antelope, bighorn sheep, and mountain goats could not be hunted. As surprising as it may seem now, eastern Montana was known as a stark "biological desert" virtually barren of antelope and deer.

It took a federal program, the support of hundreds of Montana sportsmen and landowners, and a handful of extraordinary and dedicated men to restore Montana's wildlife populations. Jim McLucas, who lives just a few blocks down the street from us, is one of those who played a singular role in Montana's wildlife renaissance. Sometimes when I see him walk past our house on his three-mile hike downtown for breakfast at the coffee shop, I wonder how he feels about the restoration of Montana's wildlife.

McLucas was born in Butte and is about as tough a man as that rugged town has produced. His nose is handsomely crooked, like the nose of a prizefighter who learned early that he could take a good punch and with that knowledge left the game well-satisfied. His stride is still long, strong, and confident, but it is his friendly, self-assured manner that lends him the mark of a good-natured man. When I saw McLucas walk by the house one morning, I went out to talk with him and it

struck me then that he remains valiant in a way young boys think of a favorite uncle.

Bob Cooney once told me that McLucas had a gift. "He just has a splendid way about him," he said. "He was such a good hand with both the people and the animals. There is a mix of qualities there that fit him so well for the work he did."

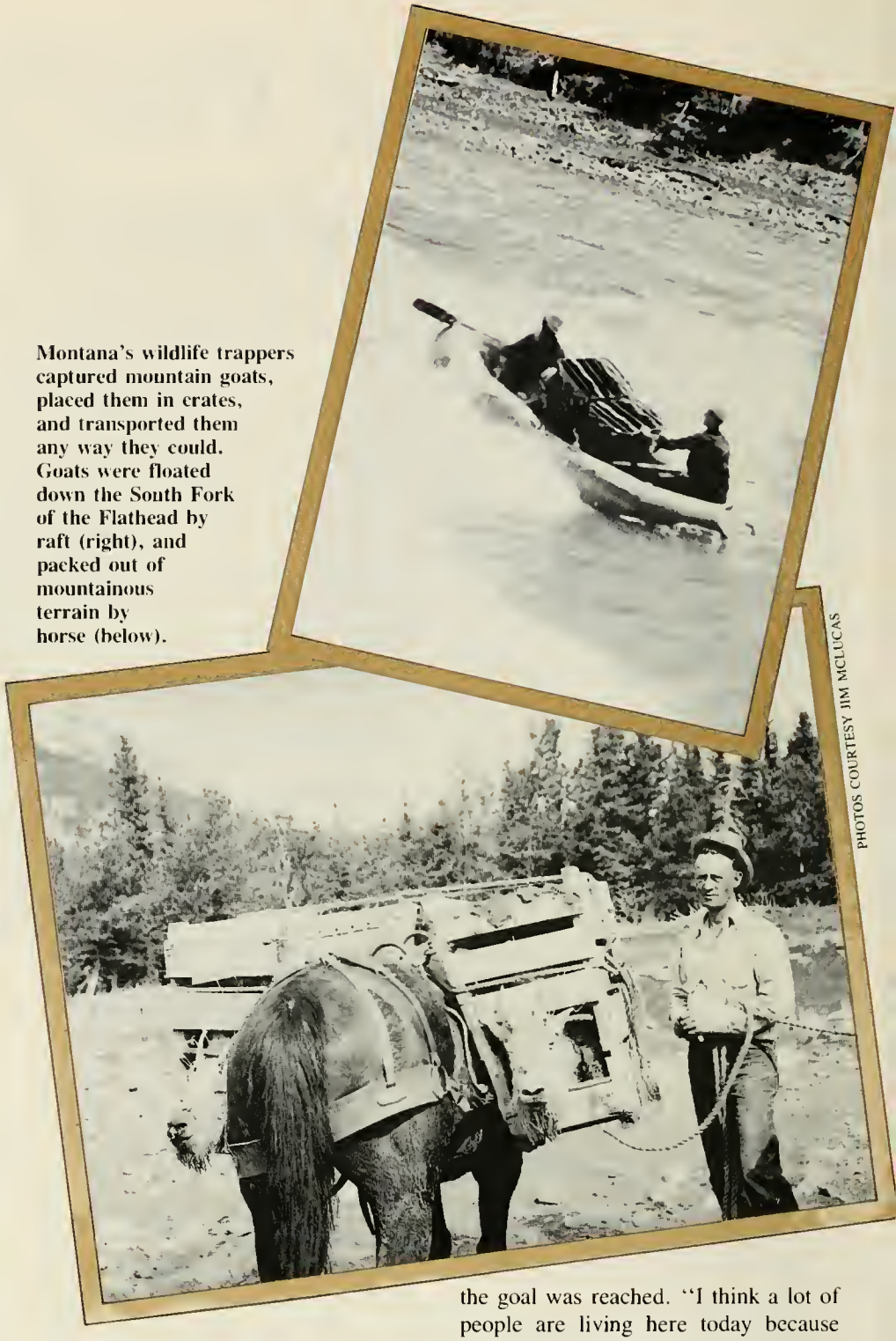
THE WORK. When I visit McLucas or Cooney and the discussion turns to "the work," I can listen for hours. It began in 1941, when Montana wildlife officials started to trap and relocate mountain goats and bighorn sheep. It's the same year plutonium was discovered and the year Enrico Fermi finally split the atom, so I suppose the notion that a salt lick lured some mountain goats into a crude trap is pretty small historical potatoes.

In those days, trappers needed a team of horses to haul the bulky wire up the mountain in a makeshift, two-wheeled wagon. When the wire was stretched over, and tacked to, rough-hewn logs, the trap vaguely resembled a primitive batting cage. The impossibly heavy trap door had to be manually tripped like a guillotine by a worker perched 300 yards away.

Once trapped, the goats were loaded into wooden crates and strapped on pack animals that hauled them out of the wilderness step by step. In terribly rugged country the goats would be loaded into rubber rafts and floated down a river. On his worst day, Fermi probably had an easier time splitting that atom.

By 1946, Bob Cooney had become the administrative chief of the Montana Fish and Game Department's new Wildlife Restoration Program and McLucas left the game warden ranks to become the department's wildlife trapping foreman. "I wanted to work with animals," McLucas explained.

Cooney and McLucas are retired now, and I can think of no other men I have met who seem so comfortable with the work they have accomplished. Theirs was a heady time and their work was driven by the department's official and well-defined goal "to provide hunting of all species in every suitable bit of habitat in the state with due consideration to aesthetic values."



Montana's wildlife trappers captured mountain goats, placed them in crates, and transported them any way they could. Goats were floated down the South Fork of the Flathead by raft (right), and packed out of mountainous terrain by horse (below).

PHOTOS COURTESY JIM MCLUCAS

This year, nearly 160,000 sportsmen hunted deer in Montana. Nearly 100,000 hunted elk, and more than 46,000 hunted antelope. More than 18,000 people applied for a special license to hunt sheep and goats and more than 800 were lucky enough to receive them. There is little doubt that the goal was reached. "I think a lot of people are living here today because they like to hunt and fish," McLucas said with pride. "I guess it was just a matter of time."

Cooney said the philosophical notion behind the trapping and transplanting was simply to refill the landscape with wildlife. "It seemed like the obvious thing to do," he said. Cooney, a spry and vigorous 80, listens with great interest and chooses his words carefully, like someone often depended

upon to get things done painlessly and right. "We wanted to expand the range of our big game species by balancing the number of game with the available habitat. That was our most important activity."

Few people recall just how important. Several times Cooney tried to leave his state wildlife post to join the war in Europe. Once he made it to the Salt Lake City train station before federal agents sent him back to Helena. "I was told the restoration program was of national importance," Cooney said. "Wildlife was considered a national asset. If there was an invasion on either coast that would have forced an inland retreat, the thought was that there would at least be a supply of meat. In those years, it was something that was pretty much on our minds."

Montana in 1941 could not have been more ready for a Wildlife Restoration Program. The conservation movement was relatively new, but in Montana there was already considerable enthusiasm and support for wildlife restocking. "The people could see what we were doing and it was the sportsmen and the ranchers who were pushing for these things. In fact, the ranchers were some of the most concerned people," McLucas said.

"It was the most obvious activity the department was doing and it was something the people could see. It was a well-understood and well-liked program," Cooney said.

FINANCIAL ASSISTANCE TO REPLENISH THE MONTANA LANDSCAPE came when funds become available through the Federal Aid in Wildlife Restoration Program. In Montana, as in many other states, general wildlife restocking was one of the first projects undertaken with the new money, but in Montana the program was particularly ambitious.

In 1941 there were about 500,000 people living in Montana, and with World War II raging there were few hands available to carry out the work in a state that stretches 550 miles from east to west and 350 miles from north to south. Considering the size of Montana, the availability of personnel, the scarcity of some species, transporting distances from sources of stock, and the state of the big game trapping art, Montana's success was rather remarkable.

In most cases, restocking occurred in areas where historic wildlife populations had been eliminated or reduced. "When we started trapping, there were only 8,000 antelope in Montana," McLucas offered. "By 1951 we had moved about 4,000 antelope and we had them established in 33 new places." The idea was to locate areas antelope had once inhabited and places where populations were having difficulty sustaining their numbers. Said McLucas: "We'd go in there and drop 100 pronghorns and BOOM! They'd have more than enough to offset natural losses."

Big game trapping techniques already developed in Arizona, Colorado, Idaho, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming were generally available to, and used by, Montana's trappers. However, as the state developed its own trapping methods and equipment, Montana trappers quickly became the nation's experts. Everything was working. The land accepted the animals as its own and the animals were brought to the land with uncommon care and understanding.

"In order to get the federal money we had to comply with certain national standards, so we were being very closely watched by the U.S. Fish and Wildlife Service and others," Cooney recalled. "We felt we were taking advantage of everything that we could and before too long it was evident to some people that Montana's program was the best."

McLucas, in particular, acquired an uncanny ability to "read" wildlife and his reputation became akin to legend. Seven fish and game agencies petitioned the Montana Fish and Game Department to loan them McLucas to help them trap big game. The U.S. Fish and Wildlife Service whisked him away for several out-of-state projects, and he was loaned to two Canadian provinces to ramrod segments of their big game trapping projects. But there were also men like Rex Smart, who refabricated the designs of the huge traps, and Cliff McBratney, a World War I flying ace who almost instinctively knew how to fly his plane in low, lazy figure eights—over miles and miles of prairie—to drive the animals to the traps. Together, Montana's first team of big game trappers made for a unique mix of unlikely experts that had no match.

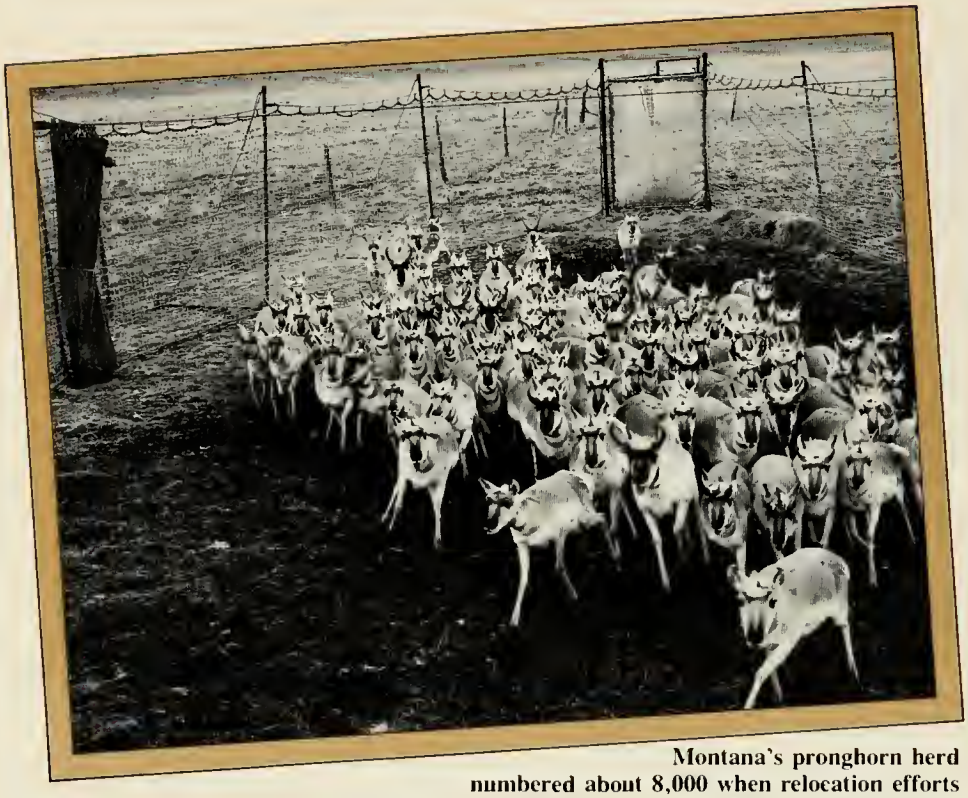
"MAYBE WE WERE ALL JUST LUCKY to be in the right place at the right time for the types of things that happened," Cooney said. "McLucas was just an expert, a genius who became the country's best trapper. We were especially lucky in that regard."

With McLucas' dependable field experience, the best trap locations and techniques came to be used year after year and crews of wildlife biologists mapped out the distribution of antelope and mule and white-tailed deer. Elk herds, too, were re-established in some ranges not occupied by elk for years.

About 400 mountain goats have been trapped and transplanted in Montana, but when work began in the early 1940s mountain goats probably had never inhabited any of the high mountain areas east of the Continental Divide. Today they can be found as far east as the Highwood Mountains south of Fort Benton, as well as in the Crazy, Beartooth, Absaroka, Big Belt, Big Snowy, and Elkhorn mountains.

Although Montana is recognized as possessing North America's premier bighorn sheep populations, the state's initial attempts to transplant bighorns turned out as badly as a prairie homesteader's first try at sodbusting. When the sheep were placed in a new area, they'd scatter out for miles like windblown, sod-busted soil. "When that happens," Cooney explained, "there's just no way for them to become established—and it was happening all the time."

BEFORE TOO LONG, Montana wildlife officials had to look outside Montana for seed stock to help get new bighorn sheep herds established. Cooney tells a story about attending a meeting of western state wildlife professionals and how he began discussing a trade of Montana mountain goats for



Montana's pronghorn herd numbered about 8,000 when relocation efforts began in the 1940s. By 1951, 4,000 antelope had been moved to 33 locations, and the herd began a rapid increase.

Colorado bighorn sheep. "A lot of the talk and trades that went on at those functions were quite informal," he said. "If a state had an animal you needed, you'd start trying to work a trade."

When Cooney sealed the deal with a handshake, Colorado agreed to send Montana 16 bighorn sheep in exchange for 12 mountain goats. When the bighorn sheep arrived in Montana, they were regarded as lovely specimens. But Montana's trappers—the first in the nation to successfully trap and transplant mountain goats—were having little luck capturing the goats needed to complete the trade.

The weeks passed. No goats.

After four decades the numbers have become hazy, but Cooney remembers how elated he felt when he finally got word that the trappers had corralled several goats in a rugged Rocky Mountain Front drainage. He also remembers how far his heart sank when he was told all the goats were billies.

"Ship 'em," Cooney said and crossed his fingers.

The days passed. Not a word from Colorado.

"I knew I'd be getting a call sooner or later," Cooney said. When he did, he still hadn't thought of an alibi.

"Well, you know, Bob, we got these goats and they sure are something," the Colorado wildlife officer said.

"Beautiful animals, aren't they?" Cooney said. "Just gorgeous."

"Oh, indeed, and we're pleased to have them, but do you realize they're all billy goats?"

"Sure!"

"Well, I don't think we'll have much luck establishing a population. We don't think having all these billies is going to be very productive."

Cooney was at a loss for words, but he just kept talking. "We've found that they're so awfully protective of their families...and in the process of transplanting these animals we've learned that it's best to send in a group of billies first...to explore the territory...before we send the nannies and kids in."

Cooney had his fingers crossed and stopped short of searching his desk for a rabbit's foot. Still, he realized that his Colorado colleague knew when it came to mountain goats Montana was in the catbird seat.

"I think he bought it," Cooney said. "And we did eventually get them some females."

Pascal said, "Things are always at their best in their beginnings," and I think that is true of Montana's Wildlife Restoration Program. The time was so right. Habitat was empty, it was the dawn of scientific wildlife management, and a new conservation ethic was slowly boring its way into the American consciousness. On the inside, there was also a communal sense of purpose for a common goal and there was a group of innovative and dedicated men who seized the opportunity to work with wildlife in a way no one had ever dreamed.

"I was delighted with the things that were going on in those times," Cooney said. "It was a rewarding kind of work. I enjoyed the sportsmen so much. They were so interested and, in many cases, the landowners were equally enthusiastic, helpful, and willing. It was nice, real nice."

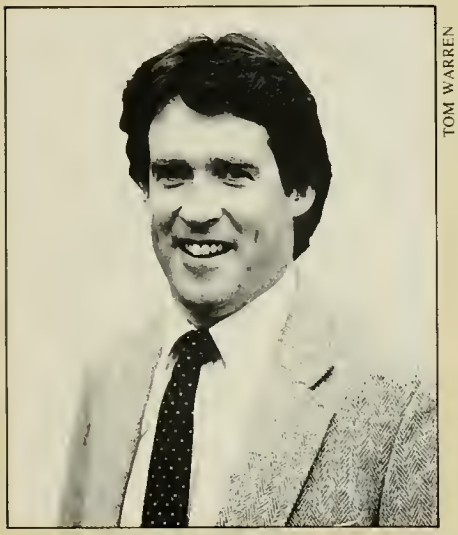
In stories like this, one is often compelled to comb the journals of Lewis and Clark to find a passage that perfectly recalls the way it was: a time when you could see "immence herds of Buffaloe, Elk, deer & Antelope feeding in one common and boundless pasture." Today, nearly 200 years after the great expedition, thanks in large part to the circumstances and the time and the gifted men who carried out the work, Montana once again has a great abundance of game.

That accomplishment is something to celebrate in these final months of Montana's Centennial year. It would, however, be a disservice to all that has come before, and to history, to think that we have restored the exotic world of Lewis and Clark. That world is lost and lost forever. But we do have something created and nurtured by man. Something very different, but something equally as fragile as that lost world. Fifty years from now, I wonder if my own grandchildren will have the luxury of waiting until tomorrow to take their youngsters to Black Mountain to hear an elk's haunting call for the first time. I wonder if they'll watch some valiant man or woman walk down the street with a head full of memories and pride about their work—work that has given their families the chance to sometimes feel this is one place where everything good can still be found. ■

Graham Named Associate Director

Patrick Graham, a 12-year veteran of the Montana Department of Fish, Wildlife & Parks (FW&P), has been named the agency's associate director. Graham, who was the administrator of FW&P's Fisheries Division for the past three years, replaces Ron Marcoux. Marcoux was promoted to deputy director.

Graham's responsibilities will include supervising division administrators. He said his new position will also allow him to devote time to youth education issues. "Two of the most important gifts we can give to our children is the ability to use information to make wise



TOM WARREN

Patrick Graham

decisions and a quality environment in which there are still choices to be made," Graham said. "I'm convinced we have to make young people aware of the complexity of the decisions they will have to make." Graham mentioned Project Wild, an elementary and secondary school curriculum that emphasizes natural resource issues, as one way to introduce children to the notion that we are all ultimately responsible for, and influenced by, the quality of the environment.

In addition, Graham said water quality, land use, endangered species management, relations with private and public landowners and Indian tribes, and rebuilding Montana's state parks will be matters of immediate concern.

Graham began his FW&P career as a wildlife biologist in 1977. He has been a fish and wildlife program manager in Kalispell, special assistant to the director, chief of research and special projects, chief of fisheries management, and the Fisheries Division administrator.

"His varied previous experience in the agency, and in particular as a division administrator, will greatly assist in quickly and effectively assuming the new responsibility," said FW&P Director K.L. Cool. "I view Pat's acceptance of this challenge as an extremely positive step forward for the department and the fish, wildlife, and recreational resources we manage."

Hunter Laws

If one looks at the history of wildlife management in Montana, the first tools put into practice were laws passed by the state Legislature to control the actions of hunters. In the early days of the state fish and game agency, there were basically two types of employees: game wardens and fish hatchery workers. Since then, the science of wildlife management has become increasingly complex, and professionally trained biologists are employed to make recommendations on how wildlife should be managed in Montana.

Just as wildlife management has become more complex, so has enforcement of Montana's game laws. Where once there were just a few game laws on the books, now there are many. Personnel must be well-trained professionals in law enforcement and, in Montana, they must have a bachelor's degree in fish and wildlife management or a closely related field.

It is important to have laws to perpetuate and/or protect wildlife, and hunters should make sure they're aware of Montana laws and that they comply with them. But it's also interesting to list the 10 most common Montana game violations. Over the last several years, here are the most common offenses:

1. Failure to immediately tag a game animal after the kill and to secure the tag to the animal so the tag is visible.
2. Failure to properly tag a game animal, which includes cutting out the month and date of the kill on the tag.
3. Using someone else's tag on a game animal you killed.
4. Tagging a game animal that someone else killed.
5. Shooting or attempting to shoot game animals or game birds from a vehicle.
6. Shooting game animals on or from any public highway or shoulder, berm, or barrow-pit right-of-way of any public highway.
7. Shooting or attempting to shoot game animals with the aid of an artificial light.
8. Using a vehicle to concentrate, drive, rally, stir up or harass game or furbearing animals.
9. Hunting without possessing a valid license or tag.

10. Failure to stop at a checking station, even if you have taken no game or fish.

While the first nine of these laws deal directly with the taking of game, the last one—about checking stations—was instituted as much for wildlife management as for law enforcement.

There are two basic types of check stations—law enforcement stations and biological stations. For the most part, law enforcement stations are not set up at permanent locations, nor are they operated on a regular schedule. Enforcement officers might set up a station for

just a few hours on a busy road when most hunters are returning home from a day in the field. Officers at these stations will normally ask to see hunters' licenses and ask if they were successful in bagging an animal. They will also check to make sure that any animals taken are properly tagged and that all other laws and regulations governing the taking of that animal were observed.

On the other hand, biological check stations are normally operated by wildlife personnel, not by enforcement officers. Although checking licenses to make sure an animal is properly tagged is one of the functions of personnel staffing these stations, it is not the primary one. Rather, wildlife personnel gather information needed to manage the state's wildlife effectively. These check stations are often located at the same place each hunting season; in some cases, they are open 24 hours a day for the entire season.

When hunters stop at biological check stations, they may be asked a variety of questions, including how much game they saw and in which drainages or the general location in which they hunted. Also, some biological check stations may have scales set up to weigh animals. If a hunter has taken a male animal, wildlife personnel may want to measure its antlers or horns. Although the information furnished by hunters is completely voluntary, most hunters realize the information gathered is important for making future wildlife decisions that can improve the management of the game animals they pursue and either maintain or improve hunting opportunities.

This fall, thousand of hunters will assist the Department of Fish, Wildlife & Parks in managing game animal populations and future hunting opportunities by stopping at game checking stations. Stopping at checking stations is a good idea—but it's also the law. Failure to stop at a checking station when the station is on your route of travel to and from the hunting area and when personnel are on duty constitutes a misdemeanor punishable by a fine of at least $50.—*Don Bianchi, Region 3 (Bozeman) information officer*

Another Friend Named Adam

A veteran Montana game warden once compared his occupation to an eternal highway with no curves. I have to admit I witnessed quite a stretch of eternal highway while serving sportsmen as a state game warden for more than two years in Kalispell and Shelby.

While I encountered many of the difficulties the veteran warden was alluding to, I also found sanctuaries—moments along the journey where I paused, enjoyed, and savored my occupation and its hidden pleasures.

I realized early in my warden career that these special moments were vital; ignoring them brought burnout and ineffectiveness. For example, late spring in the Shelby warden district was often a frustrating time. Some folks who lived in the communities of Heart Butte, Browning, and East Glacier took annual horseback excursions into the Badger-Two Medicine backcountry south of Glacier National Park to poach calving elk. My efforts to patrol the area were usually hampered by an exhausted budget, crises in other parts of my district, and the 85 miles separating the Badger-Two Medicine from my headquarters in Shelby. Some of these patrols made me catch a vision of that endless stretch of asphalt.

But some sanctuaries emerged while I was patrolling on horseback with fellow game wardens through some of Montana's most spectacular and wild regions along the Rocky Mountain Front. A former outfitter's lodge was our base camp. The lodge overlooked the Two Medicine River and it was constructed of river stones and mortar. A local sportsman who valued this elk herd and the work of game wardens donated use of the facility during these special

TOM PALMER

Montana Power Gives State Mitigation Money

A $123,000 agreement between the Department of Fish, Wildlife & Parks and the Montana Power Company to mitigate wildlife losses associated with the hydroelectric power facility at Thompson Falls promises to provide long-term benefits to wildlife. The agreement, signed in early September, ended nearly four years of negotiations between the state and the power company. Shown finalizing the transaction are, from left, Don Sprague, environmental manager for Montana Power Company (MPC); MPC Vice President for Administration Chuck Gilder; Department of Fish, Wildlife & Parks Director K.L. Cool; and John Mundinger, FW&P Resource Assessment Unit.

The $123,000 will be managed in trust, and the interest from the fund will be used to improve wildlife habitat in the Clark Fork River Basin in the Thompson Falls area.

Mundinger said habitat improvements for white-tailed deer, Canada geese, and watchable wildlife are planned. He said plans are being developed to use some funds for habitat-enhancing timber harvests, wetland enhancement, weed management, nesting structures for geese, osprey, and other nongame species, and cost-sharing habitat enhancement projects with other agencies.

"The major beneficiary of this agreement is wildlife," Mundinger said. "We are grateful to have had this opportunity to resolve this important issue in partnership with the Montana Power Company."

patrols.

During my tenure, I cherished the support of this sportsman and others who assisted me regardless of circumstances or consequences. These sportsmen, several of whom resided in the Shelby warden district, shared the high ethical regard toward wildlife that my father taught me and that my family practices.

One of the major hurdles for any rookie game warden is learning to deal calmly and rationally with those who have no respect for wildlife and despise authority in any form. It was difficult for me to fathom personally—let alone deal with professionally—those who gained economically from poaching wildlife or slaughtering cow elk on their calving grounds. I began to understand why so many wardens who once enjoyed hunting and fishing became hardened and developed alternative hobbies.

My perspective came full circle during the 1988 antelope season in north Toole County. Midmorning of opening day arrived along with four confiscated antelope in my department pickup. The antelope represented illegal activities by gunners, not sportsmen. Confiscated animals are obvious symbols—physical evidence of a warden's contact with violators, while inner peace and sanctuaries are the invisible rewards for contacting true sportsmen.

As I repositioned my pickup so I could get a better view, a commanding panorama of the Sweet Grass Hills and remnant prairies of southern Alberta unfolded. In the distance, I noticed a male hunter accompanied by a woman and a small boy. They were stalking a herd of antelope foraging on drought-stunted grasses and forbs coloring this northern Montana prairie. The elderly man carried a rifle and paused often to talk to the woman and boy. His patient, deliberate movements bespoke wisdom and experience, while his young charge reflected untamed energy and a readily apparent respect for his mentors. The woman seemed to be counseling the boy on the virtues of patience, while indicating highlights of the terrain.

It took me back 20 years, to a time when I shared similar hunts with my family; I still vividly recalled the unrelenting excitement and tortuous, yet critical, lessons about patience and stealth.

I predicted each maneuver the hunter accomplished with haunting accuracy. He crawled smoothly to within rifle range of the antelope, while the woman and boy hid nearby. Minutes passed before a single shot shattered the prairie silence, and the largest buck antelope dropped to the ground instantly. Energized emotion swept the young boy toward the fallen buck.

I moved my pickup toward the successful hunter, then closed the distance between us on foot. A skein of southbound snow geese threw soft cackles landward as I descended a narrow coulee. Jovial voices, recapturing a great stalk, emerged from the narrow wash. Jogging clumsily toward the coulee bottom, I sighted three sportsmen huddled over a fallen antelope. A shamefully childish grin spread across my face as I realized the wise, older hunter and his two companions were my parents and my 6-year-old son, Adam.

Unaware of my presence, the trio tagged and field-dressed the buck amidst constant chatter and a barrage of questions from Adam regarding antelope anatomy.

My parents shared their respect for Montana's wildlife treasures with Adam. In a sense, they were re-enacting past days shared with me. To me, they represented sportsmen who delighted in making a game warden's job easy; they represented sanctuary. And I cherished this moment of absorbing and admiring the coincidence—realizing these kinds of sportsmen provided a bend along the unbroken highway.

My two and a half years as a game warden were some of the most formative of my career. The experiences and knowledge gained strengthened my convictions about wildlife preservation and heightened my perception of sportsmen's values.

I can only hope my parents and I provide a bend along that eternal highway for the 65 wardens guarding Montana's wildlife traditions. If early indications hold true, they will have another friend named Adam.—*Craig Jourdonnais, video production specialist, Conservation Education Division*

A Hunter's Coat of Ethics

A Hunter's Coat of Ethics is special—very special. It is not an actual coat. In fact, it is invisible to all but other true hunters, and to those who are gifted enough to recognize it.

This coat cannot be purchased in any store, or from any catalog. It is earned through learning, hard work, and dedication. It is the *character of the hunter*.

This coat represents honesty, integrity, reverence, and respect for one's self, fellow hunters, family, and friends—and all wildlife and its habitat. It cloaks a learned person, confident in his or her ability as a hunter, provider, and protector.

A garment of perfect fit, this Hunter's Coat of Ethics. And it molds itself to fit each hunter individually.

Each wearer is committed to preserving wildlife and to its legitimate pursuit and utilization in recreational hunting. Each wearer is his or her own referee when it comes to conduct of the hunt. Each transcends the rules and regulations governing sport hunting.

Earning one of these coats also involves achieving minimum (but high) standards—knowledge/proficiency of safe firearms handling and care; marksmanship with rifle and shotgun; first aid and survival; outdoorsmanship; wildlife identification, biology, and habitat requirements; habitat improvement; hunting laws and regulations; hunting traditions and ethics; and hunter/landowner relationships.

All of the good achieved by this hunter is shared with the group and with our society as a whole. Thus, the good is cumulative. Each good act builds a base that is virtually impregnable by the vandalistic acts committed on wildlife by others.

Each hunter shares his bounty from the fields. Younger people need to learn the respect for life demanded by the hunter who takes the life of each animal killed. Former hunters and their fami-

lies will recognize and honor this act of sharing.

Bonds among hunters are permanent. While flexible, these bonds are not broken to accommodate unacceptable and unethical situations. Violators are not to be tolerated. But then violators and vandals are identified by their acts, and their lack of a Hunter's Coat of Ethics.

The Hunter's Coat of Ethics. A garment of blessings and privileges, of responsibilities and obligations. If you have one, wear it with pride, but not with arrogance. It can weigh heavily on your shoulders at times, especially when there is extreme criticism based on ignorance. Nonetheless, it will retain its shape, and continue to provide warmth and protection beyond this passing hysteria. And those who recognize the coat will continue to respect you as a person with true feelings for preserving wildlife.—*John Weigand, chief, Research and Technical Services Bureau, Wildlife Division*

Department Issues New Deer Report

The Montana Department of Fish, Wildlife & Parks has announced release of a new technical bulletin summarizing 12 years of field work by wildlife biologists on overlapping mule and white-tailed deer populations in eastern Montana.

Although there are fundamental differences between these deer species, they manage to coexist on the prairie. They do so by responding differently to various factors in their environment, the report says.

Mule deer, the dominant deer species on the prairie, increased 600% in eight years, while whitetails increased about 250% in five years. Population declines were almost as spectacular, with mule deer dropping 68% and whitetails 91% in just four years.

High deer numbers can result in crop depredation and exceed landowner tolerances. Hunters are usually delighted with these high numbers. However, deer numbers can also drop to levels that generate concern by both groups.

The volatility of population changes provides a challenge to deer managers on Montana's prairies, the bulletin explains. Fortunately, hunting appears to be an effective tool in reducing numbers of both species in this environ-

ment. As long as managers have the flexibility to adjust hunting regulations in a timely manner, they will be successful in achieving population levels these interest groups desire.

The bulletin is the 16th in a series of technical reports issued since 1952, according to John Weigand, chief of the Wildlife Division's Research and Technical Services Bureau. It is the first bulletin on deer.

Hunters, who provided the funds for the research and printing of the bulletin, should find it a valuable reference in understanding some of the state's prairie deer populations. "However, don't try to apply these findings to deer herds in other habitats across the state," Weigand cautions. "A mule deer on the prairie is different from one in the breaks, in the foothills, or in the forested mountains."

Bulletins are available at regional offices in Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, and Miles City and at the department's Helena headquarters.

BOOK REVIEWS

WESTERN HUNTING GUIDE, by Mike Lapinski, Stoneydale Press, 205 Main Street, Stevensville, MT 59870; 1989, 6x9 format, 162 pages, 70 photographs, $17.95 hard cover, $12.95 soft cover.

Perhaps it takes the insight of an Eastern hunter to understand how to write a Western hunting guide. Perhaps out here, the natives have forgotten what author and sportsman Mike Lapinski terms the "irresistible call of the western wilderness"—how strong it can be when you live points East. Certainly Lapinski, a Pennsylvanian who migrated West 18 years ago, hasn't forgotten the call that fomented his move, and he has faithfully recorded in his "Western Hunting Guide" everything the pining Easterner would need to know to make a successful Western hunt.

But the guide, subtitled "A Complete Where-To-Go & How-To-Do-It Guide to Western Hunting," will be invaluable to the Westerner as well, because Lapinski offers what no other Western hunting guide offers: a state-by-state description of the best places for the species of big game you're yearning to stalk.

Lapinski scouted out actual harvest statistics to lend the guide accurate, up-to-date, and specific information. He covers all of the big game species found in Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

He addresses all hunters, Western, Eastern, experienced and novice, when he advises: "It is neither the perfect stalk, nor the true flight of the arrow or bullet that insures the success of the hunt. The successful hunt was begun months earlier when the smart hunter made careful plans...." That's what the guide's all about.

For novices not yet ready to get to the meat of it, the "Western Hunting Guide" contains everything you need to know to get started. It details how to select clothing, equipment, and rifle or bow; how to physically condition yourself for hunting; how to prepare for possible emergencies in the wild, and whether to make a guided or self-guided hunt. Lapinski makes good use of photo illustrations and lists to describe proper contents of kits for field dressing and emergencies. He thoroughly explains the types of guided hunts and provides a list of questions to ask a prospective guide to get accurate information, including the guide's success rates. Handy appendixes provide addresses and names of books for further information.

To the uninitiated, like myself, the mystique of the big game hunt is a bit of a curiosity. Yet, there's something in the guide for my kind, too. Lapinski not only sprinkled it throughout with entertaining—and believable—hunting anecdotes to illustrate his points; he wrote in such an understandable, approachable way that I'm half itchy to give it a shot.—*Tara Gallagher, intern*

TO FEED OR NOT TO FEED

by William Phippen

MICHAEL H. FRANCIS

MICHAEL H. FRANCIS

In the winter of 1988-89, record numbers of elk left Yellowstone National Park and migrated north to winter range in Montana. Many of them starved, prompting wildlife officials to once again examine the question of artificial feeding.

WHEN THE SNOW BEGAN FALLING on Yellowstone National Park early in the autumn of 1988, it came as a gift from above to finally extinguish the smoldering remains of a forest fire season in the park and its environs unlike any in recorded history. The snow also acted as a renewal of hope to those who base their livelihoods on the park's natural grandeur and those who travel from throughout the nation and the world to observe it.

While inch upon inch of the region's famed "cold smoke" mounted, businessmen and park officials planned for a winter season that promised to be better than any in recent years. Snowmobilers, cross-country skiers, snow coach riders, and overnight guests at the park's major hotels would be blessed with an opportunity to view the aftermath of a spectacular, nationally publicized, natural event. They could still enjoy the park's scenic beauty, its large, observable wildlife populations, and the thermal springs and geysers that have been Yellowstone's drawing cards since the area was set aside as the world's first national park in 1872. Yet early-season visitors to the park were rewarded with a strange beauty that only an uncommon phenomenon like the fires of '88 could produce. Unburned portions of the park stood in stark, memorable contrast to the vast acreages of blackened timber etched in white.

But before the season had ended, these strangely beautiful sights were juxtaposed with those not so agreeably remembered. By the hundreds, elk in the park's famous northern Yellowstone herd were dying from starvation as they migrated toward traditional winter range north of the park in Montana. Their deaths, predicted by many as the eventual outcome of a National Park Service policy allowing elk populations

to regulate themselves naturally, were brought about by a combination of factors: a series of mild winters that had allowed the herd's already large elk population to increase dramatically; the fires of 1988, which burned major portions of the herd's winter range within the park; and several consecutive years of drought that subsequently reduced vital forage and, when coupled with normal winter precipitation during 1988-89, forced the elk to seek forage elsewhere.

Montana's annual late season elk hunts at Gardiner were nearing their close, seasons during which an eventual 2,300-plus migrating park elk would be harvested. But by mid-February of 1989, wildlife biologists with the Montana Department of Fish, Wildlife & Parks (FW&P) and the National Park Service were observing one of the largest concentrations of elk ever recorded on their traditional wintering grounds in Montana. While the 19,000 elk documented in the northern herd at the end of 1988 is an historical high, some observers estimated actual herd strength at up to 26,000 animals. For the first time since 1916, over half of this herd had migrated out of the park, onto winter range in Montana.

Given the herd's large size and the condition of the range available to it, biologists predicted that starvation losses would continue.

Indeed, they did. From across Montana and the nation, calls and letters from concerned citizens poured in to state wildlife officials and National Park Service offices promoting what seemed to those concerned a quite obvious solution to the dilemma—feed the elk.

BILL THOMAS

When elk are dying of starvation, it is human nature to want to help them. But providing suitable winter habitat—not artificial feed—is the best long-term solution to the problem.

AS SIMPLE AND PREDICTABLE as that suggestion may seem, artificial feeding of any wildlife population is a step not taken lightly by most wildlife professionals today. Although widespread feeding of big game animals was a common occurrence over much of the West in the past (it was used principally to keep hungry game animals from raiding ranchers' haystacks and, in fact, was institutionalized by the federal government when it established the National Elk Refuge at Jackson, Wyoming, in 1912), present-day game managers recognize many inherent problems with the practice:

- Once implemented, feeding prolongs artificially high wildlife populations, which will ultimately crash if feeding is terminated.
- Artificially high big game populations will seriously degrade natural vegetation and impact the entire ecology of the feeding area.
- Concentrating large numbers of animals in feeding areas significantly increases the risk of disease. On many elk feeding grounds in the West, brucellosis is a chronic problem, resulting in reduced vigor in adults and inhibiting reproduction. In Wyoming, brucellosis occurs in up to 50% of the elk at feeding stations. That compares with an incidence of between 1% and 2% in Montana, which has naturally foraging populations of elk. At least one other dangerous deer disease, lumpy jaw, and a variety of internal parasites also thrive in the crowded, stressful conditions of a feed yard.
- Artificial feeding can change natural movements or migrations that will have impacts in the future (i.e., animals stopping at areas where they have received artificial feed will return to those areas rather than moving on to what is natural winter range, thus creating an artificial dependency).
- In a normal winter, a certain percentage of big game animals die. Such is nature's way of maintaining a proper balance between wild animals and their environment. Typically, the young, old, diseased, and least fit are the first to die.
- Artificial feeding has significant impacts on the habitat surrounding feeding areas. Animals concentrated in a feeding area will continue to overutilize and destroy what natural vegetation is available as snow melts.
- Artificial feeding is futile in large, remote areas because it is literally impossible in many instances to reach some elk populations. Efforts to do so may contribute to mortality due to the increased stress caused by human intrusion.
- Some sources of artificial feed can result in the introduction of noxious weeds into an area.
- Artificial feeding can create competition with farmers and ranchers for hay, which is already selling at premium prices in a drought year.
- Artificial feeding is an expensive proposition. Wyoming spends more than $700,000 in sportsmen's license dollars and other management funds annually to support the 23 established feeding stations in that state. Combined, the Wyoming Game and Fish Depart-

ment and U.S. Fish and Wildlife Service spend over $250,000 annually just to support the 7,500-plus elk on the National Elk Refuge. At times when supplemental feeding is most attractive to those concerned with the well-being of hungry elk—those times when available natural forage is in shortest supply—high-quality feed is the most expensive. Also, since the severity of most winters cannot be predicted, those conducting artificial feeding programs must stockpile hay or other feed even in years when feeding isn't necessary, keeping costs high regardless of winter severity. Many believe limited funds could be better spent on a more long-term solution—acquisition of additional habitat for wintering animals.

RECOGNIZING THESE PROBLEMS, FW&P RECOMMENDED and the Montana Fish and Game Commission adopted a position in early March of 1989 against feeding the elk in the northern Yellowstone herd during the winter of 1989. The commission's official position statement also addressed problems with the large numbers of bison leaving the park:

> "The present elk and bison management direction in Yellowstone National Park has followed a natural regulation philosophy since 1969. This term means that primary factors affecting these populations will be natural events, with a minimum of human intervention. It is recognized that the natural regulation philosophy is a complex concept when dealing with migratory herds that move beyond the boundary of Yellowstone Park.
>
> "The winter of 1988-89 represents a period when the effects of drought, previous mild winters, fire and winter stress are combining with high wildlife populations to produce a major loss of animals. Winter starvation is the most significant form of natural mortality capable of limiting park elk and bison herds. This mortality is predicted and expected as a fundamental part of a natural regulation policy.
>
> "Elk are presently dying from malnutrition and mortality will continue well into the spring. The process of natural regulation of park elk populations dictates what is occurring, and, in essence, the process requires that elk mortality continue without human interference.
>
> "Artificial feeding, if instituted at this time, will not prevent the massive loss of elk and would not contribute to the long-term solution of the wildlife management problems associated with the park. The Montana Fish and Game Commission will not propose artificial feeding of elk on or near the boundaries of Yellowstone National Park."

Included in the commission's statement, and also as a recommendation from the department, was the suggestion that the best long-term solution "...lies in a combination of the following actions:

1. The acquiring, through lease, easement, or acquisition, of historic winter game ranges capable of supporting migratory elk in an ecologically sound configuration.
2. Addressing the regulation of elk and bison populations within the park.
3. Initiating a cooperative county, state, federal, and private effort to address long-term solutions for the northern elk and bison herds, both within and outside Yellowstone Park.

"Artificial feeding will be considered," the statement continued, "only in extreme emergencies, which rarely occur," such as: "to prevent unacceptable losses to individual big game population segments where the habitat is adequate to support the existing populations but an unusual snow or ice event puts large population segments in jeopardy."

Vividly attuned to the situation unfolding just north of the park, the 1989 Montana Legislature made a similar statement when it passed a resolution directing FW&P to work cooperatively with all parties involved to seek a workable, long-term solution to the habitat needs of the northern herd. Artificial feeding, the resolution noted, should be considered only in emergency situations.

After the commission's statement and the Legislature's action, the department, U.S. Forest Service, National Park Service, and Rocky Mountain Elk Foundation signed a hallmark Memorandum of Understanding through which the parties agreed that securing funds for acquiring critical wintering areas for the herd should be a top priority. Several key areas have been identified and the total cost of acquiring these areas has been estimated at $8 million. As this issue of *Montana Outdoors* went to press, Montana Governor Stan Stephens and all the members of Montana's congressional delegation were taking the lead in securing federal funds to complement the up to $2 million Governor Stephens said FW&P would commit if federal funds could be secured.

That acquisition of habitat, key wintering areas, and traditional migratory corridors is clearly the best long-term solution to resolve the plight of the northern Yellowstone herd—and that supplemental feeding is not—is echoed by wildlife managers throughout the West.

Ron Marcoux, deputy director of FW&P, said, "Quite simply, it makes sense to most wildlife professionals to spend the dollars available on a long-term solution rather than on a feeding program that would conceivably only compound current problems with this herd."

Nevertheless, as always happens when a well-meaning public views newsreels of starving elk, deer, and other wildlife, there will always be cries to feed. The public may focus on those states that conduct on-going feeding programs and ask, "Why not Montana?"

According to Glenn Erickson, management bureau chief for the FW&P in Helena, routine winter feeding in Wyoming, Utah, Idaho, and Washing-

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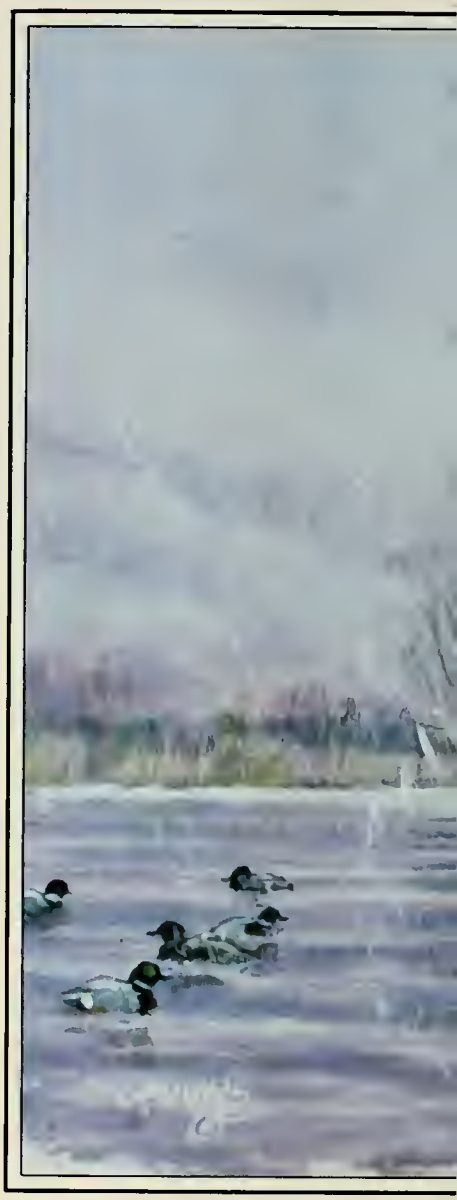
Musings in a Duck Blind

by Dave Books
illustrated by Roger Cruwys



7:30 a.m. It's a little before sunrise on November 11th, and I'm sitting in my duck blind on an island in the Missouri River not far from Helena. "Duck blind" is somewhat of a euphemism, since it's just a collection of driftwood and brush I've thrown together. My black Lab, Maggie, is sitting on my left, and my 12-gauge shotgun is resting against a log to my right. Eleven mallard decoys (I wonder what happened to the 12th?) are moving in the river current, tethered to their lead anchor weights.

It's cold this morning, somewhere in the vicinity of 15 degrees, and I've got a wool stocking cap pulled down over my ears. I'm wearing longjohns, wool pants, a heavy wool sweater, a down vest, and a hunting coat, and my hands are snuggled into heavy wool mittens. The only chink in my armor is my feet—I had to wear waders to make the crossing to this island—and even though the waders are made of insulated rubber, I know that my feet will eventually be cold.

Maggie, coated with a rime of ice from swimming the channel, is shivering, but more from excitement than from cold. She is all eyes and ears, scanning the sky for ducks and pacing nervously. Perhaps she, too, heard the haunting, musical cries of the Canada geese passing over town last night, pushing south before the Arctic cold front. Moving with them, I know, will be fat, grain-fed mallards—so-called "northerns"—fresh from the fields of the prairie provinces. For carnivores like me, who salivate at the very thought of roast duck, this November storm is a clarion call to action.

Sunrise. I have to check my watch to make sure it's legal shooting time. Because of the hills that rise above the river to the east, I won't see the sun till well past dawn. I hear a rifle shot back in the mountains, and think about my unfilled deer tag. Winter meat. But this is a day for hunting ducks.

7:50. Maggie sees them before I do. She tenses and stares upriver. "Sit!" I hiss, slipping off my right mitten and reaching for the duck call hanging on a lanyard around my neck. I hear the whisper of wings overhead and freeze, head down. When I'm sure they're past the blind, I blow a low, guttural feeding chuckle into the duck call. About 200 yards downriver, the flock of eight mallards turns and heads back toward my decoys, pushing into the wind. I blow one more hasty feeding chuckle, drop the call, pick up my gun, and whisper "Stay!" into the ear of my quivering dog.

I will shoot only drakes this morning; it will be hard to tell them from hens in this poor light. One thing I know for sure: When I can clearly discern sex, the birds will be well within shotgun range. I am on one knee, coiled like a spring, ready to rise and shoot.

The birds are close now, angling down to the decoys on cupped wings, no more than 25 yards from where I'm crouched in my blind. The lead bird is a hen, the second a drake. I rise as inconspicuously as possible, but the birds know immediately I am there. They flare, wings pumping to gain altitude. I nudge the safety switch of my over/under forward with my thumb, and when the gun barrel is ahead of and a little above the glossy, green head of the first drake, I pull the trigger. Silence. I lean into the gun to absorb the anticipated recoil but there is none, and I lurch forward, almost losing my balance. Feeling strangely foolish, like a man who has slipped on a banana peel, I look around to see if anyone is watching. But I know that no other hunter shares my little island on this wintry November morning. Maggie looks at me in puzzlement, head cocked to one side. She is as surprised as I am at this unexpected turn of events.

Looking upriver, I see more ducks headed my way. No time now for wondering what's wrong. I open the gun, remove the shells, put in two new ones, and thumb the selector switch to the other barrel. I close the gun, check the top lever to make sure it's locked, and grab my duck call.

This time, it's a bigger flock of ducks. They look over the spread, fly downriver a few hundred yards, make their swing, and come. At the propitious moment, I jump up, aim, pull the trigger, and contemplate another cosmic silence. Maggie stares at me in disbelief, and I shrug my shoulders apologetically. A line from a funny poem I once read pops into my head, "...you couldn't pepper a duck if it was in the oven." With this gun, that's certainly true.

I open the gun, remove the shells, open and close the action several times, and peer in at the firing pins. They look okay, but I'm no gunsmith. I inspect the primers of the shells that have failed to fire. I can see only a tiny nick where there should be a deep dent. For some reason, the firing pins are not falling with enough force.

I hear shots from down the river, around the bend—someone is shooting MY ducks—rubbing salt (or is it pepper?) into the wounds. In despair, I hurl some rancorous invective into the teeth of the wind.

8:00-8:30. I am literally covered up with ducks. Fat, gray-flanked greenheads and sassy brown hens—even a couple of bull sprigs. I jump up and down like a kid with a popgun—Bang! Gotcha! The ducks grin and fly away. Maggie leaps in and out of the blind, twirling in distracted circles. If anyone is watching, they will think we've lost our minds.

I fiddle with the gun. I comfort my distraught Labrador. I cuss. Nothing seems to work. Finally, I have an idea. I unload the gun and break it down,

separating the barrels from the stock. I put the stock—which contains the trigger mechanism—under my coat, where things are relatively warm and toasty. If something is gummed up from the cold—and that seems a likely bet—perhaps it will thaw.

8:45. The ducks have quit flying, at least for the time being. The river is quiet, save for the murmuring of the current and the gentle swish of snowflakes beginning to fall. I sit disconsolately in my blind, slumped against the driftwood log. My feet are getting cold. I should give up and go home, but I'm too stubborn. When I shut my eyes, I can see—and smell—one of those plump mallards, plucked and drawn, stuffed with slices of apple and onion, browning in my oven. Why does food suddenly dominate my thoughts?

9:00. A flash of movement on the bank upstream catches my eye. A mink pops out of the willows and scampers along the water's edge. Maggie sees it, and her neck hackles rise. A growl emanates from deep in her throat, and her upper lip curls back, exposing long, pointed canines. My gentle dog, who I would trust with any child, has teeth designed for tearing meat and jaws equipped for splintering bone. Does some ancestral instinct tell her the mink—a fellow carnivore—is a competitor for food, and hence an enemy?

I hear more shots from down the river. That carnivorous son-of-a-duckbuster is shooting at my birds again.

9:15. Looking wistfully out over the water, I think of summer, and of fly-fishing. I imagine trout beneath the surface—hard, silver torpedoes, cold to the touch. It was just coming dusk that sultry night last August, when the Dutchman and I drifted slowly along the far shore in my johnboat. It was his turn to man the oars, and mine to fish. Up against the cliff, where the current doubles back on itself and forms a deep eddy, the water suddenly heaved and boiled. Into the air shot a rainbow trout of perhaps eight inches, arrowing upward a good two feet, hugging the rock wall, and coming to rest, miraculously, on a tiny ledge. It hung there for a long second, glowing like a vein of silver against the dark volcanic rock; then, as if resigned to the inevitability of its fate, it flipped its tail feebly and dropped back, almost in slow motion, to the waiting embrace of the river. A huge trout surged forward, dorsal fin out of the water, and the hapless rainbow disappeared.

For a moment, we sat transfixed, our eyes as big as saucers. Then a voice inside my head shrieked, "Cast! Cast!" So I flicked my tiny caddis fly to the scene of the recent carnage, recognizing it at once as a futile and impotent gesture, like throwing popcorn to a shark or offering a lion a stick of chewing gum. The big trout was doubtless well beneath the surface, digesting more substantial fare.

9:30. Across the river, a large, dark bird glides slowly above the hillside. Probably a golden eagle. It, like the mink, must take life soon, or forfeit its own. There is a certain honesty to being a predator, I think—not that wild creatures are concerned with moral judgments. Nature kindly spares them the burden of premeditative thought and the anguish of remorse. They know only the gnawing hunger of an empty belly, and the contentment of a full one.

Strange musings in a duck blind. Perhaps I'm in the early stages of hypothermia—body temperature slowly dropping, brain cooling, synapses becoming sluggish, nerve impulses misfiring, mind wandering. It's snowing harder now. I should get up and tend the decoys—real ducks don't have half an inch of snow resting on their backs. But it's cozy here among the driftwood, out of the wind, and I hesitate to move.

9:45. This idle daydreaming is getting me nowhere. My toes are freezing. It's time to fish or cut bait. I pull the gunstock out from under my coat and lurch stiffly to my feet. I fit it to the barrels, attach the fore-end, and drop two shells into the chambers. Pointing the gun out over the river, I switch off the safety and pull the trigger. The roar seems deafening, a rude intrusion on this pastoral winter scene. I'm always surprised at how loud a gun sounds when I'm not shooting at a moving target. I walk to the river, stamping my feet to get the blood circulating, and brush the snow off my decoys.

10:00. Ducks emerge suddenly, noiselessly, out of the swirling snow. Six mallards peer downward at my little spread, wings braking slightly as they pass. They disappear into the snow again, headed downriver, but I have a strong hunch they'll be back. In a few minutes, they reappear, this time from the west, heading my way.

10:05. When I pull the trigger the lead drake folds, falling to the river with a splash. Maggie hits the water running, spray arching high over her back. She churns out into the menacing current, quickly closes on the drifting bird, wheels, and swims hard for shore, breathing through her nose with noisy "chuffs." Emerging 50 yards downstream, she trots proudly back to deliver her prize. That done, she shakes violently, spraying me with flecks of frost.

I hold the lifeless bird in my ungloved hands, contemplating its heavy warmth, feeling its luxuriant softness. Turning it slowly, I admire its emerald head, its chestnut breast, its orange-red legs. What does it mean? In the near term, dinner. Later in the winter, some fly-tying feathers. In an abstract sense, reaffirmation of my role as carnivore. But there is something more, something harder to define. Primeval satisfaction? Yes, but tempered with a twinge of sadness.

The Spanish philosopher Ortega Y Gasset wrote, "Every good hunter is uneasy in the depths of his conscience when faced with the death he is about to inflict...He does not have the final and firm conviction that his conduct is correct." That is true, and given that we no longer have to hunt for our dinner, it is perhaps appropriate to examine our motives, to ask ourselves, "Why?" I asked myself that question today in a duck blind, and I was content with the answer.

* * * * *

• *This article first appeared in the August 1989 issue of* Orvis News. *It is reprinted with their permission.* ■

Those Small Montana Wild Cats

by Scott Brainerd

MY EYES WERE RIVETED ON A SMALL, ISOLATED PATCH of Douglas-fir directly in front of me on the jumbled, rocky hillside. Loose boulders shifted under my weight, threatening to alert the female bobcat nestled in her den a few yards away with newborn kittens. Her presence was as palpable as the intensifying beep of her radio signal in my earphones. With as much stealth as my assistant Cathy Schloeder and I could muster, we inched forward. We hoped the strong afternoon wind would carry our scent away as well as mute the noise of our approach.

Cathy shared my anxiety, moving carefully and testing each foothold as if she were traversing a minefield. I peered carefully through the tangled branches, looking for some clue of the den. I guessed it was only about 30 feet away, and I hoped it wasn't hidden among the innumerable recesses in the rocky slope. If the mother slipped out undetected, we might never find the kittens.

I gave Cathy the radio gear, and quietly motioned to her to skirt the left side of the small stand and move in on the den. I eased to the right, holding back, hoping to get a clear view if the cat flushed. Rocks shifted under Cathy's weight. I watched and waited, camera ready, cringing every time a loose rock tumbled down the hillside. Suddenly, the female bobcat made her move, breaking from the timber into an open area. She

hunkered in an odd, snakelike fashion, crouched low, leapt over a dead snag, and paused 30 yards away. She turned and glowered at me. I quickly snapped a photo before she slipped into nearby underbrush.

I could almost feel the mother's eyes upon us as we looked among the rocks where I had first spotted her. Cathy discovered the kittens in a rotten log, sheltered from the elements by a dense tree canopy. There, in a cozy bed of duff, lay two tiny week-old kittens. Eyes shut and ears pinned down, they breathed rhythmically and snuggled instinctively together. Unlike their mother, these two were oblivious to our presence. We took a few notes and photographs and quickly retreated. Mother soon rejoined her offspring.

Our hour-long stalk paid off. Information we collected about this family would supplement information gathered in previous years on litter size, survival, and denning habitat selection. These data would tell us more about denning requirements and perhaps aid wildlife personnel in managing habitat for bobcats.

Bobcat and lynx research in Montana

After the United States signed the Convention on International Trade in Endangered Species in 1973, biologists began several bobcat research projects throughout the country. This treaty protected larger spotted cats, such as the leopard and cheetah, through a world export ban. Market pressure shifted to the remaining smaller spotted cats, including the bobcat and juvenile Canada lynx. In 1977, an amendment to the treaty stipulated that bobcats and lynx were "threatened" as a result of market pressure. Thus, the United States was forced to begin monitoring the export of bobcat and lynx pelts. Each state with bobcat populations had to meet certain requirements in order to export these cat pelts, and this meant that research was needed. (Brian Giddings explained these provisions in his March/April 1988 article in *Montana Outdoors*, "Prairie 'Cat.")

Montana researchers had not devoted serious attention to either the bobcat or lynx, but several projects were started in 1979. Coordinated by Howard Hash, statewide furbearer biologist for the Montana Department of Fish, Wildlife & Parks (FW&P), researchers began studying bobcats in western Montana in 1979 and in eastern Montana in 1983. Researchers also conducted a bobcat study on the Charles M. Russell National Wildlife Refuge in north-central Montana. Research emphasized bobcats, which occur throughout the state. The lynx is much less common and resides only in isolated subalpine areas in the Rocky Mountains of western Montana. But because we were lucky enough to capture some lynx in the western Montana study, we were able to gather some valuable information on their movements and habitat use.

The primary objectives of the Montana bobcat studies were to detail habitat use, movements, home range use, and reproductive patterns in different geographical areas of the state, including the mountainous forests of the west, and the arid, open prairie in the east. This information would be used to define management guidelines essential for proper management. In addition, FW&P personnel collected several hundred bobcat carcasses harvested from 1979 through 1983 by Montana trappers; the reproductive tracts of these cats provided information on litter size, age at first breeding, and pregnancy rates for different age classes.

Through the Montana Cooperative Wildlife Research Unit, graduate students from the University of Montana, Missoula, began the western Montana studies. Randy Olson began trapping in the Garnet Range in 1980, but his life ended tragically in a car accident in the study area during his first winter field season. Drew Smith took over Randy's study and completed his master's degree research on bobcat habitat use, movement patterns, and home range size.

After Smith completed his research in 1982, I started the second phase of the study, looking primarily at reproduction and denning habitat, while continuing to collect data on home range and movements. Although research in other parts of North America had revealed some information on litter size, breeding seasons, and denning habitat, little was known about these aspects of bobcat ecology in the coniferous forests of western Montana. In addition to gathering this information, we continued to trap and radio-collar bobcats. We concentrated on getting a large sample of adult and female bobcats and kittens; we also radio-instrumented any lynx captured incidentally. To aid in our efforts, we also worked with experienced local trappers, such as Dick Browne in Thompson Falls and Arlee Crownover and Howard Kirk in Clinton. The project benefited greatly from their experience, interest, and expertise.

During the winters of 1980-84, we radio-collared 29 bobcats and ear-tagged an additional five. We obtained nearly 1,000 radio locations which we used to analyze habitat use and home range. Thirteen bobcats were killed by humans, and four died of natural causes. We also trapped and radio-instrumented 10 lynx in the Garnet Range; five were legally harvested, two died of natural causes, and one disappeared by the end of the study. We lost contact with the other two after the study ended. We located these lynx 250 times during the five-year study.

We selected study areas which reflected the typical mountainous, forested country of western Montana. We were spread a little thin, because we had marked cats in the Cabinet Mountains, near Thompson Falls, the Garnet Range, and the Mission Mountains (within the Flathead Indian Reservation). The Cabinet and Mission mountains are extremely rugged and contain lush forests unlike the more rolling, open Garnet Mountains. Radio-tracking from aircraft seemed to be the most efficient method for locating animals, particularly when limited road access and steep topography often made radio-tracking from the ground difficult and time consuming.

The adaptable bobcat

Bobcats inhabit a variety of habitats throughout North America, including forests and mountainous areas, as well as semi-deserts and brushlands. They rely on concealment for hunting success and security from enemies, and forests with thick undergrowth and rocky terrain seem to provide this.

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READERS RESPOND

Should Property Rights Extend to Water?

There is a growing awareness among all citizens that the present system of water allotment in the West is an anachronism that has long outlived its usefulness and no longer serves the best interests of society. The present system of "first in use—first in right" was established over a hundred years ago by miners and agricultural interests to benefit the early economic interests of the region. Little thought was given to the needs of society as a whole, much less any consideration for the needs of fisheries, wildlife, or aesthetics.

Today, a large segment of society is beginning to question whether it's legally and ethically fair for these water users, primarily agricultural interests, to drain rivers and streams dry. As a solution, some have proposed buying water from those who presumably own it to keep minimum flows in our rivers and streams.

Although buying water may be one way to increase river flows (for a look at water management on the Bitterroot, see "Pushing Forward on the Bitterroot" in the Sept./Oct. 1989 issue of *Montana Outdoors*), I personally find it an objectionable solution, for it assumes that individuals have a genuine "right" to own water. I believe it could and should be argued that owning a natural resource so essential to the needs of wildlife as well as human health and happiness should be outlawed. It would be just as outrageous for any group to claim that it had "rights" to the air we breathe.

There is an analogy to slavery here. To suggest that those who wish to maintain minimum flows in rivers and streams should have to purchase water is analogous to suggesting that those who opposed slavery should have purchased all the slaves in the South in order to set them free. Such a solution does not address the fundamental question of whether property rights should extend to an element—water—so essential to our common survival and well-being.

Finally, the concept of buying water often fails to look at whether the ability of agricultural interests to sell water in the first place is not the result of other taxpayer subsidies. In many, many instances, farmers and ranchers depend on taxpayer-subsidized dams, irrigation canals, and water delivery systems to get water to their property in the first place. In the West, water is subsidized an average of $54 per acre-foot. In addition, the electricity used for operating irrigation equipment is also subsidized by higher electrical rates paid by urban dwellers. Asking those who support instream flows to pay these agricultural interests to keep water instream is asking society to pay twice for something that no one should "own" to begin with.—*George Wuerthner; Livingston*

About Those Wardens in Maine...

I read with great interest the article on "Wildlife Law Enforcement—The Early Years" in your July/August issue. Being a Maine game warden, I can well appreciate this kind of story.

I would like to clarify a couple of points on the history of Maine's Warden Service.

Some time after Maine's admittance to the union (1820) came the first attempt at fish law enforcement. These men enforced some laws relating to harvest of Atlantic salmon. The Department of Inland Fisheries was established in 1850.

As for hunting, there had been game laws pertinent to the basic seasons since 1830, but since there were no bag limits, no enforcement was attempted. The first attempt to enforce any game laws came in the mid-1860s when the Legislature authorized seven counties to appoint moose wardens. These men met with limited success and received anywhere from $25 to $85 per year, depending on the apprehensions they made.

In the 1870s, things began to change. The 60 wardens who were empowered to enforce the fishery laws were not empowered to enforce game laws. Although a law was passed in 1873 which reduced the bag limit to three deer a year and the season had undergone alterations, there still was no enforcement.

For several years during this period, the various commissioners in the Department of Inland Fisheries had pleaded with the Legislature to extend the powers of fish wardens to include enforcement of game laws as well. The reason for their refusals is age-old: There simply was no money. Finally, on March 9, 1880, a law was passed by the Legislature that gave power to the fish wardens to enforce game laws. When it passed, the Maine Warden Service was born.—*Daniel E. Tourtclotte; Guilford, Maine*

Cow Chips and Hawk Nests

During a recent trip through your most beautiful state (I am a trucker), I happened upon the May/June issue of your magazine; I enjoyed it very much.

I would like to comment on a statement from the article, "Three from the Centennial." The statement was about how cow chips are often found in hawk nests, but their exact function is unknown.

May I be permitted this commentary? It is known that ruminants (cows, goats, sheep, and others) produce many of their own vitamins and other nutrients, the excess being passed out in their feces. This is one reason hogs sometimes follow cattle in pastures and also why chickens peck in cow manure. I will not go into detail about animal behavior and foraging, but this should offer at least a simplistic explanation.

I have been out of the agricultural discipline for some time, even though I do have an agricultural degree and was employed by the U.S. Soil Conservation Service for a period of time. Conservation and the outdoors is in my blood, and I truly appreciate everything that each state's conservationists do to conserve and enhance each state's resources.—*Edward F. Chopay; Jamesville, New York*

MONTANA OUTDOORS INDEX

The major items published in *Montana Outdoors* in 1989 are indexed below. Extra copies of all '89 issues are available at $2 each (includes postage). The following back issues are available at the same price:

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1977—all issues, including Yellowstone Special Issue

1978—all issues, including Special Parks Issue, except May/June

1979—all issues

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To inquire about or order a back issue, write: Back Issues, *Montana Outdoors*, Department of Fish, Wildlife & Parks, 930 Custer Avenue West; Helena, MT 59620.

BOOKS REVIEWED

Times and Places, Home and Away: A Life of Freelancing in the Outdoors—by Charles F. Waterman (March/April).

The Great Cookbook Entertainer—compiled by the Buffalo Bill Historical Center (March/April).

Just Dogs—Willow Creek Press (March/April).

Bronc to Breakfast & Other Poems—by Mike Logan (March/April).

Make Me A Moose! With No Fleas, Please—by Mark Henckel (March/April).

We Montanans—by Norma Tirrell (Sept./Oct.).

Radical Elk Hunting Strategies: Secrets of Calling Elk in Close—by Mike Lapinski (Sept./Oct.).

The Last Best Place—edited by William Kittredge and Annick Smith. Our pictorial book review of this Montana anthology featured art by Robert A. Kercher, Jack Hines, Robert F. Morgan, and Gary Carter (Sept./Oct.).

Western Hunting Guide—by Mike Lapinski (Nov./Dec.).

FISH/FISHING/WATER

Revisiting the Smith—Through cooperative efforts of government, private landowners, and recreationists, the Smith River can continue to provide quality fishing and floating in a near-wilderness setting (Joel Shouse, March/April).

Travelin' Fish—The bull trout is one of Montana's largest native fishes, and it poses quite a challenge for anglers (John Fraley, March/April).

On Fishing...—Anglers, conservationists, ranchers, legislators, business people, and those who capture our imagination with pen or brush have given life to the future of Montana's fisheries (Patrick Graham and Art Whitney, May/June).

Certifying Whoppers—The 1988 list of Montana's record fish (May/June).

Perspectives—"478...479..."—An ant-gobbling cutthroat trout intrigues a fisheries biologist (Don Tennant, illustrated by Rich Stevenson, May/June).

Two Fish Pros Honored—The Fisheries Division named Dick Vincent "Professional of the Year" and Mark Gaub "Technician of the Year." The Catchall (May/June).

Mineralogy on the River—A trout the color of sapphire and agate (by Chris Manning, illustrated by Parks Reece, July/August).

Belt Buckle Features State Fish—The Centennial buckle features the cutthroat trout. The Catchall (July/August).

Perspectives—"Musselshell Magic"—Join the author in a year-long fantasy trip down a stream on the eastern Montana prairie (Wade Fredenberg, illustrated by Randy Bishop, Sept./Oct.).

The Year of the Big Dry—By early spring, there were warnings that the furies were conspiring to let us have it good (Tom Palmer, Sept./Oct.).

Pushing Forward on the Bitterroot—By taking an active interest in water management, residents of the Bitterroot Valley have come one step closer to resolving conflicts over use of their most valuable resource (Ron Spoon and Dennis Workman, Sept./Oct.).

GAME/HUNTING

The Worth of Hunting—The Montana Bioeconomics Project provides insight into the values, preferences, and attitudes of Montana's hunters (Rob Brooks and John Duffield, March/April).

Montana Means Elk—The department has developed an elk management plan. The Catchall (Tom Palmer, March/April).

Bighorn Auction—A Million-Dollar Deal—Money from the annual auction of a bighorn sheep permit has provided a significant boost to Montana's bighorn sheep program. The Catchall (Kay Morton Ellerhoff, May/June).

Unusual Trophy—Chadd Laws' trophy buck turned out to be a doe. The Catchall (Tom Lemke, May/June).

1988—A Record Elk Harvest—Statistically, elk were taken by about one of every three elk hunters for a Montana record harvest of 26,211 animals. The Catchall (Tom Palmer, Sept./Oct.).

Perspectives—"Musings in a Duck Blind"—A black dog, chilled toes, and contemplation of death and life (Dave Books, illustrated by Roger Cruwys, Nov./Dec.).

Montana's Bison: A Management Dilemma—To say the least, Montana's buffalo hunt has been controversial (Ron Aasheim, Nov./Dec.).

GENERAL

Special Photo Issue—(Jan./Feb.).

Perspectives—" 'Pane-ful' Tale of a Sage Hen"—A sage hen's navigational system goes amok (William Court's letter, illustrated by Mike Mosolf, March/April).

Cruwys Scores a Double—Roger Cruwys of Bozeman has won the waterfowl stamp competition twice in three years (Bill Phippen, March/April).

Vest-Pocket Preserves—Montana's natural areas are biological marvels and geological jewels (Susan Reel, March/April).

Jim Flynn: A Good Job—Flynn served as department director for eight years. The Catchall (Dick Johnson, March/April).

New Book Celebrates Montana's State Parks—The book celebrates the beauty and resources of the state park system. The Catchall (Bill Phippen, March/April).

Dan Palmisciano: A Tribute—Remembering the contributions of Dan Palmisciano, wildlife laboratory supervisor for the department in Bozeman. The Catchall (March/April).

Experiencing the Past—The desire to relive an earlier, simpler time draws us to the historic and archaeological sites that are part of Montana's parks system (article and illustrations by Dick Ellis, May/June).

Three New Commissioners, One New Director—Errol Galt appointed chairman of the Fish and Game Commission; Greg Barkus and William Stratton join the commission; and K.L. Cool is named department director. The Catchall (May/June).

New Entrance Fees Help Ailing State Parks—New entrance and camping fees will result in better facilities at Montana's state parks (Loretta Johnson, July/August).

Doris—From her recollections about the Flathead's past to a raspberry here and there, Doris Huffine has been an inspiration to the author (John Fraley, July/August).

I Am in Love with Montana—Photographs capture a few of Montana's many faces (calligraphy by Jeanne Moon, July/August).

Flying Fish...and Other Tales—How a retired warden was hit with flying fish, and how he developed a "nose for buck" (Wayne Fitzwater, July/August).

Perspectives—"Food for the Soul"—Montana's parks offer the chance to do away with clocks, appointments, and schedules (Marty Watkins, illustrated by Diane Nugent, July/August).

Small Lakes—Big Opportunities—Some of Montana's small lakes offer an incredibly diverse array of recreational opportunities. The Catchall (Marty Watkins, July/August).

Dick Johnson Retires as Deputy Director—After 27 years, Johnson's leadership and professional abilities will be missed. The Catchall (July/August).

Terry Hill Receives Shikar-Safari Award—The Billings warden was named "Wildlife Officer of the Year." The Catchall (July/August).

"The Full Circle"—The department's new film tells the story of how the wildlife and wild places of Montana have been preserved. The Catchall (Sept./Oct.).

Winterkill—No one will ever know for sure how many elk died in and adjacent to Yellowstone National Park in the winter of 1989 (Tom Lemke, Nov./Dec.).

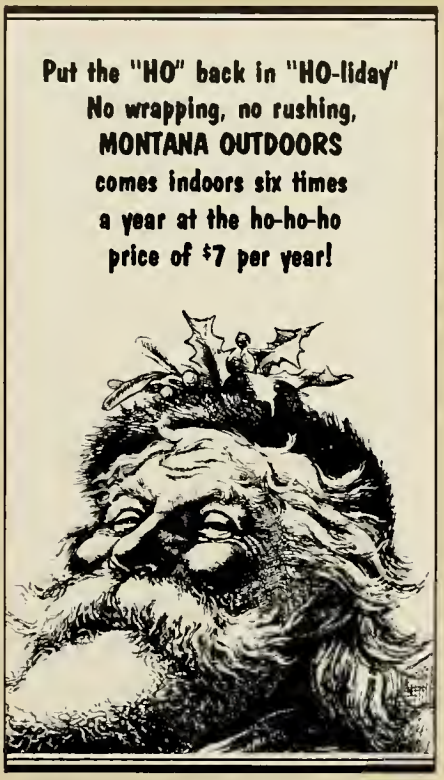
Graham Named Associate Director—Former administrator of the Fisheries Division Patrick Graham was named as the department's associate director. The Catchall (Nov./Dec.).

WILDLIFE

King of Birds—The golden eagle still has the power to fascinate and inspire earth-bound hunters (Al Harmata and Dennis Flath, plus a sidebar by Tom Palmer about Al Harmata, March/April).

DU Canyon Ferry Project is "For the Birds"—Waterfowl at Canyon Ferry will benefit from this cooperative venture. The Catchall (Bill Phippen, March/April).

Of Prairie, Bears, and People—For grizzly bears on the Rocky Mountain Front, favorable winds of change are blowing (Mike Madel, May/June).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Nongame Sampler—"Glaring Gnome"—The diminutive northern pygmy-owl measures only six to seven inches from the top of its head to the tip of its tail (Denver W. Holt and Rick Kline, photos by Rick Kline, May/June).

Three from the Centennial—Three species of buteos—soaring hawks—inhabit the Centennial Valley: red-tailed, ferruginous, and Swainson's hawks (story and photos by Marco Restani, May/June).

Least Terns Spotted in Southeastern Montana—This delicate white sea bird was spotted at Fort Peck Reservoir. The Catchall (Sarah B. Hall, May/June).

Nongame Sampler—"Mountain 'Gator"—The northern alligator lizard is no stranger to Montana (story and photos by Charles B. Place, III, July/August).

Wildlife Law Enforcement—The Early Years—During Montana's territorial and early statehood periods, many individuals sought to protect wildlife (Joan Louise Brownell, July/August).

Living with Bald Eagles—The Montana Bald Eagle Working Group invites you to join them in learning how to conserve our national symbol (compiled by Robin Magaddino, July/August).

A Partnership for the Future—Those who thrill to the sight of ducks on the wing should support the Montana Prairie Pothole Joint Venture (Jeff Herbert and Tom Hinz, Sept./Oct.).

Nongame Sampler—"The Digging Machine"—In Blackfeet legend, the striped-face badger possessed his own great strength and spiritual powers (Tara Gallagher, Sept./Oct.).

The Right Place, The Right Time—Jim McLucas and Bob Cooney were tailor-made for Montana's trend-setting trapping and transplanting program (Tom Palmer, Nov./Dec.).

To Feed or Not to Feed—Artificial feeding is a step not taken lightly by most wildlife professionals (William Phippen, Nov./Dec.).

Those Small Montana Wild Cats—Both bobcats and lynx are secretive, reclusive, and shy (Scott Brainerd, Nov./Dec.).

Nongame Sampler—"Arising, Alighting Ibis"—Before 1980, sightings of white-faced ibises in Montana were rare (Kristi DuBois, Nov./Dec.).

CONTRIBUTORS

• People all over the country were concerned. **Tom Lemke**, a biologist for the Department of Fish, Wildlife & Parks (FW&P) stationed in Livingston, was hit with numerous questions every day: How many elk have died? How many live elk did you count? How many will survive? When will it be over? What can I do to help? There are no easy, quick answers, Lemke concludes, especially in situations as emotionally charged as this one. In "Winterkill," beginning on page 2, Lemke explores the 1989 elk situation in and adjacent to Yellowstone National Park. Lemke holds a Ph.D. in ecology and brings a diverse research background to his FW&P biologist's job.

• When you read **Tom Palmer's** article, which starts on page 7, we think you'll agree that Jim McLucas, Bob Cooney, Rex Smart, Cliff McBratney, and a few like-minded others were in "The Right Place" at "The Right Time." Today it's hard to think of Montana as having limited populations of deer, elk, antelope, bighorn sheep, and mountain goats. But just 50 years ago, Montana was a different place, and it took a federal program, the support of hundreds of Montana sportsmen and landowners, and a handful of "extraordinary and dedicated" men to restore Montana's wildlife populations. Palmer's article is a look at two of those "extraordinary and dedicated" men—McLucas and Cooney—and their unusual and incredible contributions to Montana's trapping and transplanting program. Palmer is an information officer for the department in Helena. His book, "Helena—The Town and the People," was published in 1987 by American Geographic. He is editing a trout habitat rehabilitation handbook, written by Chris Hunter and scheduled for publication by Island Press in 1990.

• After you read Tom Lemke's article on winterkill, turn to **William Phippen's** on page 15. "To Feed or Not to Feed" is the dilemma he explores, and much of what he covers is an outgrowth of the 1989 winterkill in the northern Yellowstone elk herd. He emphasizes that artificial feeding is expensive and that it does not contribute to the long-term solution of the problem. He writes, "Securing additional habitat to provide these essential commodities is truly the only long-term solution." In a sidebar Phippen wrote to accompany Lemke's winterkill article, he also explores "Cooperative Solutions"—efforts under way to obtain and protect critical winter habitat for the northern Yellowstone elk herd. Phippen is an information officer for the department in Helena.

• This issue's "Perspectives" finds *Montana Outdoors* Editor Dave Books musing from a duck blind. The objects of his deliberations—ducks—have been wonderfully captured by Bozeman artist **Roger Cruwys**. Cruwys is no stranger to waterfowl—in the last three years, he has twice won Montana's waterfowl stamp competition. The 1989 stamp features a black Labrador retrieving a drake pintail, and the 1987 stamp was graced by "Evening Arrival—Redheads." He has also been a finalist in waterfowl or trout stamp competitions in California, Nevada, Ohio, South Carolina, Pennsylvania, Kentucky, Illinois, and Oregon. He has placed in the top 10% of the federal waterfowl stamp competitions he has entered. And, in 1984, the state of North Dakota commissioned Cruwys to paint its first-of-state trout/salmon stamp. Cruwys is a self-taught, full-time artist whose game birds, dog portraiture, and angling art have found ready acceptance throughout the country in major galleries, private collections, and national sporting magazines.

• "Those Small Montana Wild Cats" are the bobcat and the lynx—and until 1979, Montana researchers had not devoted serious attention to them. Beginning on page 21, **Scott Brainerd** tells you about research that helped answer many questions about bobcat ecology—and a bit about lynx populations as well. He concludes that bobcat populations seem to be slowly increasing in western Montana and that lynx were probably never abundant in the state and still occur in isolated, remnant populations. He emphasizes that "conservative management" of both species will ensure their important role in the mountainous regions of Montana. Brainerd is a Ph.D. candidate in wildlife ecology at the Agricultural University of Norway in Oslo.

• Think of the buffalo. Like many other people, you probably think of thundering herds and westward settlement. As **Ron Aasheim** writes, "...the buffalo holds a special place in the hearts of Americans." That's perhaps why Montana's modern-day buffalo hunt evokes such strong feelings in people all across the country. Aasheim points out the hunt is not an attempt to "recall the excesses of a long-vanished frontier." Instead, it is an effort to control a growing Yellowstone Park buffalo herd. That herd poses serious problems outside the park for private landowners and for Montana's livestock industry because of the potential of the buffalo transmitting brucellosis to domestic livestock. Turn to page 27 for a look at "Montana's Bison: A Management Dilemma." Aasheim is administrator of the department's Conservation Education Division in Helena.

• White-faced ibises were hunted for their feathers in the 1800s, and they were considered a game bird in California until 1915. In Montana, the first confirmed white-faced ibis nest was found at Bowdoin National Wildlife Refuge in 1970. Before 1980, ibis sightings were rare in the state. But since 1985, the number nesting at Bowdoin and Benton Lake National Wildlife refuges has increased, and additional nesting colonies have been discovered. As **Kristi DuBois** points out, some biologists think that ibises are expanding their range, but others think they have been in Montana all along, but overlooked. DuBois is a wildlife biologist for the U.S. Fish and Wildlife Service. She is working on a study of selenium contamination on national wildlife refuges in Montana. This issue's "Nongame Sampler," "Arising, Alighting Ibis," begins on page 30.

• *MO* thanks the following for their contributions to this issue: photographers **Rick Bartel**, **Bill Swanson** and **Jan L. Wassink**, Kalispell; **Pete** and **Alice Bengeyfield**, Dillon; **Kristi DuBois** and **Raleigh Meade**, Great Falls; **Michael H. Francis** and **Larry Mayer**, Billings; and **Bill Thomas**, Missoula, who works for the department.■

Montana's Bison: A Management Dilemma

MICHAEL H FRANCIS

by Ron Aasheim

PERHAPS BECAUSE OF THE ONCE-THUNDERING HERDS and the role it played in westward settlement, the buffalo holds a special place in the hearts of Americans. Most people know that although the buffalo was pushed to the brink of extinction, remnant populations held on in Yellowstone National Park and in private herds scattered throughout the West.

From its estimated pre-settlement population of some 40 million, by 1900, the plains buffalo numbered fewer than 1,000. Conservationists fought tirelessly to save it from extinction, and with the gradual rebuilding of the Yellowstone herd and establishment of national herds in Montana, South Dakota, Oklahoma, and Nebraska, the buffalo's future was eventually assured.

Perhaps because of its dark history of slaughter and near-extinction, the killing of buffalo today—for any reason—conjures images of those wasteful days. And perhaps that is why Montana's modern-day buffalo hunt evokes such strong feelings in people all across the country.

Montana's hunt, however, is not an attempt to recall the excesses of a long-vanished frontier. On the contrary, it is an effort to control a growing Yellowstone Park buffalo herd that poses serious problems outside the park for private landowners and, most specifically, for Montana's livestock industry. To understand the rationale for Montana's hunt one needs to know the history of the buffalo in Yellowstone Park and some facts about brucellosis, a bacterial disease that can cause domestic livestock to abort their calves.

BY THE TURN OF THE CENTURY, time was clearly running out on the buffalo. Poachers had whittled the Yellowstone Park herd, which in the 1880s had numbered about 500 animals, down to 25. In 1902, President Theodore Roosevelt, by direct presidential action, appointed a Yellowstone Park

game warden and charged him specifically with bolstering the bison herd. With better protection and introduction of animals from private herds, the park herd slowly began to grow; by 1928 it numbered almost 900 animals, and by the early 1930s it had grown to about 1,200.

In the 1950s and '60s, when park policy called for direct control of ungulate (hoofed mammal) populations, buffalo numbers were kept between 400 and 1,000, with approximately 200 on the northern range (the northern range includes the Lamar Valley and that portion of the park north from the Lamar Valley to Gardiner, Montana). In the late 1960s, however, when the park's policy changed from one of direct control to letting nature regulate animal numbers, the bison herd began to grow. By the winter of 1988-89, herd size exceeded 2,800, with 900 on the northern range. Animals from this northern segment of the herd occasionally leave the park and wander north into Montana near Gardiner.

WITH THE INCREASE IN BUFFALO NUMBERS, livestock interests in Montana and surrounding states expressed concern about the potential for transmission of brucellosis to domestic livestock. A significant number of park buffalo are carriers of this contagious disease, which is difficult and costly to control. Between 1952, when Montana began an accelerated program to eliminate brucellosis from its cattle, and 1984, when Montana was declared brucellosis free, the state and its livestock producers spent over $30 million on eradicating the disease. In 1984 alone, it is estimated that brucellosis cost livestock producers in the United States more than $60 million. Although some have questioned whether brucellosis can be transmitted from bison to cattle, a USDA-funded study conducted in 1988 at Texas A&M University showed conclusively that under controlled conditions the disease transmits as readily from bison to cattle as it does among cattle.

Primarily as a result of the brucellosis threat, but also because of the property damage caused by buffalo wandering outside the park, in the early 1970s various state and federal agencies, fish and wildlife organizations, and livestock associations met to address ways to control bison. The result was a boundary control program for Yellowstone National Park. In essence, this agreement stipulates that the National Park Service (NPS) will attempt to keep buffalo within the boundaries of Yellowstone, and if such control efforts should fail, the elimination of buffalo will be considered. Under the agreement, the Montana Department of Fish, Wildlife & Parks (FW&P) is responsible for eliminating wandering buffalo that are determined to be a problem in Montana.

FEW BUFFALO WANDERED OUT OF THE PARK in the 10 years before 1985, and Yellowstone's boundary control program appeared to be working reasonably well. Between 1974 and 1984, 13 animals that left Yellowstone were killed by FW&P employees and many buffalo were herded back into the park. But in the winter of 1984-85, large numbers of buffalo left the park, and 88 were killed by department employees.

Due to the large number of bison leaving the park that winter, the NPS initiated an environmental assessment to evaluate the problem and suggest possible alternatives for control. At the same time, the Montana Legislature, seeing an immediate need to address the buffalo issue, passed a law adding wild buffalo to Montana's list of big game animals. Considerable debate accompanied the legislation, which the department opposed. It was the department's position that the buffalo herd should be managed by the NPS and maintained at a size compatible with the habitat available within the park. Further, the department did not want the park to interpret legislative action authorizing

BILL THOMAS

"Montana's buffalo hunt, to say the least, has been controversial. It has focused national media attention on Montana, and many accounts have placed the sport of hunting in an unfavorable light. Still, many feel that the hunt is a humane answer to a difficult problem."

the hunt as the state's preferred position. And, finally, due to the controlled nature of the hunt that would be necessary, the department recognized the potential for negative public reaction to the hunter and hunting. Some sportsmen's groups, however, maintained that as long as buffalo were going to be taken, sportsmen, rather than agency personnel, should be allowed to harvest them. And the Montana Legislature agreed.

As a result of the debate and complexity of the issue, a "statement of intent" was prepared to accompany the law: "Hunting should be considered only one of many solutions available to the FW&P and the NPS to control migrating buffalo." It also encourages further negotiations and cooperation between the two agencies to seek other methods of controlling, as soon as possible, the migration of buffalo into Montana. Nevertheless, in the winter of 1985, and each year since, FW&P officials administered a buffalo hunting season.

Administration of the hunt begins with prospective participants submitting their applications. Each application is accompanied by a $5 fee for a random drawing that takes place in August. From that drawing, a roster of potential hunters is assembled. The season begins October 1.

Procedures and guidelines governing the hunt are very specific. When bison leave the park, individuals on the roster are called in the order in which their names were drawn and informed that they must be at a certain location within 36 hours. They are also told they may be required to harvest an animal designated by FW&P. Anyone who declines the opportunity is removed from the roster. Sportsmen have one day after arrival at the specified site to harvest a buffalo. If a sportsman has a reasonable chance to harvest a buffalo on the day assigned, but does not, the license fee ($200 for residents and $1,000 for non-residents) is forfeited and the individual's name is removed from the roster. All hunters are accompanied in the field by an FW&P employee, and thus far the success rate has been 100%.

In the winter of 1985-86, 57 buffalo were taken by hunters; in 1986-87, six were taken; in 1987-88, 39 were taken; and in 1988-89, 569 were taken. Currently, after four hunting seasons, the northern herd contains about 400 animals. Most of the hunting has taken place in the vicinity of Gardiner, although some buffalo have been harvested near Cooke City and some near West Yellowstone. Although most of the harvested buffalo have been taken by sportsmen, a few sick, inaccessible, or problem animals have been taken by FW&P employees. Every buffalo taken has been tested for brucellosis; more than half have been carriers of the disease.

Montana's buffalo hunt, to say the least, has been controversial. It has focused national media attention on Montana, and many accounts have placed the sport of hunting in an unfavorable light. Still, many feel that the hunt is a humane answer to a difficult problem. The issue is complicated not only by the many special interest groups involved—i.e., ranchers, sportsmen, and animal rights activists—but by the different philosophies and policies of the public agencies involved. The NPS position, or policy, is that wild, free-roaming bison have unique aesthetic and scientific values which will be compromised if bison are destroyed or manipulated *in* the park. So, nature runs its course in the park, while the NPS continues to cooperate with FW&P and assists with administering the hunt *outside* the park.

The FW&P believes that the responsibility for resolving the issue lies primarily with the NPS. The department has urged the NPS to establish a long-range control program that will address options for limiting bison numbers in the park. At the department's request, the NPS agreed to establish a core number of bison for the northern herd (200 for the winter of 1989). The Montana Fish and Game Commission, in turn, agreed not to reduce the northern herd below this core number unless there is an immediate threat that brucellosis will be spread to domestic livestock. Discussions between the agencies are ongoing, and an interim management plan is being developed.

Regardless of the outcome of these discussions, the buffalo will no doubt continue to generate controversy, as it has for the past 100 years. On the positive side, the issue has led to an increased interest in and understanding of the habitat needs of the ungulates inhabiting Yellowstone.

Bison will never again roam the plains by the millions, as they did in the days of Lewis and Clark, but neither will they teeter again on the brink of extinction—their future is assured for posterity. The ongoing question in Yellowstone and in Montana is how best to manage these magnificent animals in a way that safeguards the integrity of the herd, satisfies the public interest, and protects the rights of private landowners outside the park. ■

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ARISING, ALIGHTING IBIS

by Kristi DuBois

WEARING CHEST WADERS, *I gingerly stepped out of the canoe into the lake at Bowdoin National Wildlife Refuge near Malta. The water was only two feet deep, but the mud went on forever. Fighting to keep my balance, I slowly plodded toward the bulrushes where Assistant Manager Fritz Prellwitz and I were working on a survey of nesting birds, including white-faced ibises.*

Each step was a major effort: First, rock your foot back and forth, pulling up as hard as you can and trying not to fall over when it finally comes loose. Think of it this way—you're lifting 20 pounds of mud with that foot. Step forward, but not too far forward because you must maintain the leverage necessary to pull out the other foot, which by now has sunk to China.

As if the mud weren't enough, it was also a hot, humid day, so after a few steps I was drenched in sweat. The down side is that waders are a portable sweat lodge, but the positive side is that they keep the leeches off your legs. But we couldn't do much about the mosquitoes swarming around our faces and arms.

Once we hit the bulrushes, walking became easier because the roots offered a fairly solid base, but we had to watch out for holes. The tops of the hardstem bulrush waved three feet above my head and in the air high above that, gulls, terns, herons, and ibises screamed their disapproval. It seemed a place built for wide-brimmed hats! Ahead of us, several hundred eared grebes streamed out. We carefully waded between their nests—soggy piles of floating algae. Soon I spotted a ruddy duck's nest with eight large, chalky-white eggs.

Fritz's yell interrupted my inspection. I could barely make out his hat through the dense foliage, even though he was only 30 feet away. He had found a canvasback nest. Soon we found several black-crowned night-heron nests—carefully constructed bulrush bowls containing four robin's-egg-blue eggs.

We finally reached the ibis nesting area. Our arrival had caused the young ibises to scurry out ahead of us through the cattails. We could see their nest platforms of bulrush stems flattened and soggy from weeks of trampling. Now, the youngsters were almost ready to fly. We were startled to find six or seven dead ibis chicks scattered on the nest platforms. We wondered if a storm had killed them, but the tiny bodies were too decomposed to provide an answer, so the mystery remains unsolved.

A tiny gray coot chick calmly watched as I fought my way through a wall of stems to reach the edge of the bulrush island. Hundreds of ducks, coots, and grebes skittered out of the water in front of my path. They moved so quickly and easily compared with my slow, laborious stride. We wanted to leave as quickly as possible so the birds could return to their nests and young, but algae mats slowed the canoe and our paddles got stuck in the ever present mud. The difficulty of travel in muddy, shallow wetlands may have a lot to do with our lack of knowledge about ibises.

* * * * *

THE OLD NAMES of "bronze ibis" and "black curlew" provide a good description of the white-faced ibis. It resembles a large, long-billed curlew, with long legs and a long down-curved bill. It appears black from a distance, but up close one can see shades of chestnut. The feathers glow with an iridescent sheen of green, blue, and purple, especially on the wings. Like a mallard drake's head, the ibis' color

White-faced ibises (right photo: Raleigh Meade) were rarely sighted in Montana before 1980, but since 1985 the number of nesting ibises (inset photo: Kristi DuBois) at Bowdoin and Benton Lake National Wildlife refuges has increased.

changes with lighting. In dark patches of bulrush, the ibis almost disappears. During the breeding season, the adult white-faced ibis sports a white patch around the base of its bill, distinguishing it from the similar looking glossy ibis.

The white-faced ibis breeds in the western and southern United States and Mexico, and in southern South America. The largest western U.S. nesting colonies are in Utah, Nevada, and Oregon. Smaller colonies exist in Montana, Wyoming, Colorado, Idaho, California, and Kansas. Most of the breeding colonies in the eastern U.S. are in the coastal marshes of eastern Texas and Louisiana. White-faced ibises from the west winter mainly in Mexico, with a few wintering in southern California and the Gulf Coast of Texas and Louisiana.

There are 33 species of ibises in the world, including the spoonbills, famous for their spatula-like bills. Most are found in tropical areas. Besides the white-faced and glossy ibises, North America has four others: wood ibis (wood stork), white ibis, scarlet ibis, and roseate spoonbill.

So close is the resemblance between the white-faced and glossy ibis that some authorities consider them different races of the same species. The two interbreed in zoos, but do not interbreed in the wild even where ranges overlap in Louisiana. Although glossy ibises are found only along the Atlantic Coast in North America, they are widespread in Europe, Asia, Africa, and Australia. Some scientists believe the glossy and white-faced ibises in North America may have resulted from two different glossy ibis visitations from Europe—one in prehistoric times, which evolved into the white-faced form, and the other in the 1880s, which is still the original glossy form.

Ibises feed by probing their long bills into soft mud and water. Shallow marshes and flooded croplands are favorite feeding areas. Ibises eat insects, salamanders, leeches, worms, mollusks, crayfish, frogs, and fish. One ibis collected in Texas had feasted on earthworms, and another collected in Utah had eaten two adult grasshoppers and a field cricket.

IBISES ARRIVE AT THEIR NESTING AREAS in April and start nesting in May. They nest in colonies, which range from a few pairs up to several hundred pairs. In Montana, colonies usually comprise 50 or fewer pairs. They often nest with other colonial nesters such as black-crowned night-herons, eared grebes, and Franklin's gulls. Montana ibises usually build nests of old stems in cattails, hardstem bulrush, or alkali bulrush over shallow water. In the southeastern U.S., ibises may nest in trees. They are shy birds, so their colonies are often far from roads or other human disturbance.

Ibises lay three or four light blue or greenish-blue eggs. The female incubates the eggs during the night, although both sexes share the daytime stint. When exchanging nest duties, they perform a ceremony of mutual billing, preening, and cooing. Parents regurgitate food from their crops into their bills when feeding downy young. As the young grow, the parents regurgitate food into the nest. The young stay in the nest for two to three weeks, then start wandering through the bulrushes and cattails. They continue to return to the nest platform to roost and feed until they are about six weeks old. By that time, they are starting to feed themselves. By seven weeks, the young are flying to feeding areas with the parents. During late summer, ibises travel around in large flocks, feeding in marshes and irrigated fields. By the time October cottonwoods glow golden along Montana's rivers, the ibises are gone, heading south toward wintering areas in Mexico.

IBISES NEST IN DIFFERENT AREAS from year to year, depending on water conditions. Ibis colonies are boom or bust—they raise many young in wet years and none during severe drought. Too much water can sometimes be a problem. Several large ibis colonies were flooded when Utah's Great Salt Lake rose to record levels between 1982 and 1985. Nesting populations increased in Oregon during that same time, possibly because of an influx of Utah birds.

The first confirmed white-faced ibis nest in Montana was found at Bowdoin National Wildlife Refuge in 1970. Sightings of white-faced ibises in Montana were rare before 1980. However, since 1985, the number of ibises nesting at Bowdoin and Benton Lake National Wildlife refuges has increased, and additional Montana nesting colonies have been discovered. Some biologists think that ibises are expanding their range, but others think ibises have been in Montana all along, but overlooked.

White-faced ibises were hunted for their feathers in the 19th century when large plumes decorated women's hats. The white-faced ibis was hunted as a game bird in the late 1800s and early 1900s. Until 1915, the ibis was considered a game bird in California, with an open season from Oct. 15 to March 1 and a daily bag limit of 20 birds. They are now fully protected (it is illegal to shoot them and illegal to possess dead ibises, ibis body parts such as feathers, or ibis eggs without a federal permit) in both the United States and Mexico.

Despite legal protection, banding studies in Utah during the 1960s found shooting was the major cause of death. Banded ibises were recovered in a variety of places and died from a variety of reasons. But most of the band returns were from birds illegally shot for food in Mexico due to ignorance, poverty, and lack of law enforcement. Other causes of death listed in that study were botulism, hawk predation, and accidental trapping.

DURING THE 1970s, researchers noticed a more serious threat: eggshell thinning from contamination by DDT and other organochlorine pesticides. (These are insecticides that persist in the environment. As they move through the food chain, they become concentrated in predators at the top of the chain. They are usually very toxic to humans and other animals, and one of the problems they cause with bird reproduction is eggshell thinning.) Researchers at Bear River National Wildlife Refuge in Utah noted reproductive failure during 1967-70 from eggshell thinning due to DDT contamination. Researchers believed

the birds picked up the DDT on their wintering areas in Mexico. A 1977 Utah study showed no apparent eggshell thinning, but researchers need to be watchful since DDT is still used in some Latin American countries.

Disturbance of nesting colonies has increased, as more bird-watchers, photographers, and boaters take to the field. One small ibis colony at Ruby Lake National Wildlife Refuge in Nevada failed to produce young in 1985 because refuge visitors disturbed it. Colonial nesting birds such as ibises are more vulnerable to disturbance than birds with scattered, solitary nests. The noisy colonies attract attention, and the smallest intrusion is noticed by every bird.

The primary threat to white-faced ibis populations is habitat loss—and the problem is not a new one. Naturalist Arthur C. Bent described the plight of a Texas ibis colony. Bent's description was written in 1926, describing a colony that was large and healthy in 1879, but gone by the time he wrote his book: "The interesting colony, found near Brownsville, Texas, many years ago, described by George B. Sennett (1878) and Dr. J.C. Merrill (1879), had long since disappeared; the swamp has been drained and is now cultivated land. So far as I could learn there are now no ibises breeding in that section of Texas."

Naturalist Richard H. Pough described the status in 1946, "Drainage and reclamation projects have destroyed many of the marsh areas where these ibis were once abundant and, despite full legal protection from hunting, they have diminished in recent years."

Destruction of wetlands and drought in recent years have taken their toll on waterfowl and other water birds. Draining and other land-use practices have decreased the amount of wintering habitat in Mexico. Because of these threats, the white-faced ibis is being evaluated for possible listing as threatened in the Great Basin (including Utah, Nevada, and California).

* * * * *

WE FINALLY REACHED THE BOAT RAMP *at Lake Bowdoin and pulled the canoe up on shore. It felt good to walk on solid ground. Thousands of bird eyes watched us from the lake, to make sure we were leaving.*

Our rough estimate of the number of nests in the five acres of bulrushes was 50 white-faced ibis, 1,000 or more eared grebe, 150 black-crowned night-heron, four ruddy duck, five American coot, one redhead, and one canvasback. No other habitat type in Montana is as productive.

The future of the white-faced ibis depends on wetland preservation from Montana to Mexico. Wetland restoration programs could provide a secure future for the ibis and other water birds. Someday, we may be able to see white-faced ibises the way Bent saw them in 1923, "—as far as we could see over the big expanse of marsh, birds (ibises) were constantly arising and alighting; there must have been several thousands of them."

The Natural Heritage Program is collecting information on the white-faced ibis in Montana. If you have information, contact David Genter, Montana Natural Heritage Program, Montana State Library, 1515 East Sixth Avenue; Helena, MT 59620 (406/444-3009). ■

To Feed or Not to Feed

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ton doesn't mean that game managers in those states are unaware of the problems artificial feeding may cause. Instead it reflects the tremendous influence and political weight public opinion can have on a state's game management efforts. "In almost all situations in which supplemental feeding is now taking place," Erickson said, "populations of those animals being fed would plummet if the feeding were to be discontinued, and the resultant public outcry would be deafening."

In the foreword to a report John Weigand, chief of wildlife research for the department in Bozeman, co-authored with FW&P researcher Richard Mackie in 1985, "A Review of Winter Feeding of Big Game Animals and Potential Application in Montana," the authors wrote: "Montana is unique in many respects from other states and provinces in the northern Rocky Mountains where winter feeding has occurred. Montana retains a diversity of big game and other wildlife throughout the state. It has not experienced the extensive human development that has occurred elsewhere, or at least such development is less widespread. Because of this we can still foresee potential problems ahead, and can afford to be more general or liberal in our interpretation of management problems or needs than those who have nowhere else to go but to feeding programs. Montana still has the opportunity to restrict development, to avoid or reduce habitat loss, and to apply other management practices as alternatives to feeding in most areas."

Erickson said informing the public about the problems inherent in artificial feeding and the available alternatives that may present more beneficial long-term results for wildlife is a goal that deserves the department's utmost effort. "Realizing that goal is even harder when you have conditions like we did [in 1989], when the problems are so visible to the public and the urge to feed is so strong," he said. In the end, biologists estimate that approximately 40% of the 19,000 elk documented in the northern Yellowstone herd at the end of 1988 were removed from the herd, the vast majority through winter-kill, over the winter and early spring of 1989.

"People have emotions," Erickson continued, "and it's not easy standing by and watching animals die. It's not easy for any of us."

Perhaps Mark Henckel, outdoor editor for The Billings Gazette, best summarized the humanitarian appeal of feeding in a February 16, 1989, Gazette editorial. "It's man's nature, I suppose, to be softhearted," he wrote. "Man sees the suffering and tries to make it all better. He sees the hunger and wants to feed."

Yet in the end, the short-term feeding solution is not a cure. It only treats the symptoms of a wildlife population lacking adequate wintering areas and natural forage. Securing additional habitat to provide these essential commodities is truly the only long-term solution. ■

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Prey, such as mice, squirrels, chipmunks, and small birds, is also found in such areas.

Bobcats lack the specialized snowshoe feet of their lynx cousins so in winter they avoid soft snow deeper than six inches and seek lower elevations and more southerly exposures where travel is less encumbered.

Throughout the year, they do not use clearcuts, although they use some logged areas. In general, they prefer high, steep slopes, and are rarely found at elevations below 4,600 feet. These rocky, forested sites are ideal for resting, denning, and hunting, and provide shelter and security from natural enemies, such as coyotes.

Bobcat densities have always been much higher in the eastern prairie rangeland section of the state than in the western, more mountainous, part. In eastern Montana, Greg Risdahl, a graduate student at Montana State University in Bozeman, estimated one bobcat per three square miles in better habitat. In poorer habitat, such as open prairie sagebrush and grassland flats, he found lower bobcat densities, one bobcat per eight to 10 square miles.

In contrast, Drew Smith estimated that the best habitats in western Montana—lower elevation forests dominated by Douglas-fir with shrub or grass/forb understories, or rocky areas with at least some forest cover—supported densities of up to one bobcat per 10 to 12 square miles. Poorer habitats in western Montana, such as upper elevation lodgepole pine and open rocky areas with less than 5% tree cover, support fewer animals, about one bobcat per 25 to 30 square miles.

Therefore, eastern Montana's prairie rangeland habitats support roughly three times as many bobcats as the rugged, forested mountain habitats of western Montana. Reasons for this are probably linked to lowered prey availability in the west, but perhaps more significantly to the limited winter habitat available to bobcats in western Montana.

A system of territories

Bobcats are territorial, with females rarely overlapping on adjacent ranges. Male territorial behavior is more relaxed, and territories of neighboring males may overlap partially, and encompass one or more female territories. Since these home ranges are rather rigid for adults, home range sizes are a reliable indicator of relative population densities in an area.

In the mountainous, coniferous forests of western Montana, the territories of male bobcats averaged 40 square miles. Females had smaller ranges, about 25 square miles.

Bobcats have different movement patterns, depending on the season. They move most and their territories are largest during spring and fall. In spring, primarily in March and April, males wander extensively looking for females. Females also move about more within their territories seeking the right sire for next season's litter. During summer, denning females make forays from den sites, but are otherwise restricted in their movements. Kittenless females and males continue to wander from place to place within their territories in summer, much as they do throughout the year, but ranges in summer are smaller than in spring or fall. Increased movements in autumn may be related to increased energy demands brought about by cooler weather, or the bobcats may be building up winter fat stores. In winter, movements again become restricted, and bobcats concentrate in spots at lower elevations with less snow.

Breeding and kitten-rearing

Breeding season is from mid-February through early April. As already mentioned, a male bobcat moves extensively and may cover up to 10 miles a night looking for a female. After he finds one, the breeding pair may spend several days traveling together. I observed such a breeding pair in March 1984 and was able to predict the birth date of the kittens in early May, given the gestation period of about 65 days. Two or three kittens are born between late April and early July, with the peak in May and June.

Many bobcats den on talus slopes or limestone outcrops. Dead, fallen snags offer excellent concealment and cover for young kittens. Such areas, as well as abandoned mines, seem to offer unlimited nooks and crannies for kittens to hide in during their most vulnerable period—the first 10 weeks of life. In one case, a female denned within an abandoned, partially collapsed mine shaft. Bobcats often denned near secondary roads; relatively light traffic did not appear to upset family groups.

Although denning areas are relatively fixed, with a female restricted to a small area, undisturbed families sometimes move between several dens during the summer. When the den is particularly secure, such as a deep mine shaft, the bobcats do not alternate between dens. Early in the denning season (May through July), the dens are usually within 500 yards of each other, but later the family group may move a few miles between denning spots as kittens become more mobile.

Our measurements showed that dens were difficult for the human eye to detect at any distance, and were always in secure spots with deep recesses or a variety of alternate hiding places. As kittens grow older, they begin making short forays away from the den and are susceptible to predation by natural enemies such as birds of prey and coyotes. We surprised one 7-week-old kitten on such a talus slope and it disappeared under some large boulders in a matter of seconds.

Kittens have it tough

By summer's end, kittens are old enough to travel with their mothers and families begin moving more. After denning season, we were unable to get reliable information on kitten survival because family groups were on the move and were harder to pin down. Kittens also apparently chewed off the antennas on their mother's transmitters, which made it impossible to find family groups during the fall.

If kittens can survive their first winter, their future chances are improved. We radioed three bobcats during their first winter, and only one survived to adulthood. One bobcat was poached, and the other legally harvested. Some researchers think that when food is less available, energy requirements of

the mother take precedence over the offspring. Thus kittens may starve to death, but the mother may still scrape her way through the hard winter and live to try again that next spring.

Family groups split up during midwinter, just before mating season. Juvenile bobcats must then seek unoccupied territories in which to establish their own ranges, and may wander long distances in their quest. In general, adult animals must die for these territories to become vacant. Transient ranges, the areas these individuals roam, can be rather large. Juvenile females have a more difficult time establishing territories because adult female territories are so exclusive.

One of our marked juvenile females had a transient range of 172 square miles. Other juvenile females had ranges between

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Lynx have never been common in Montana; unlike bobcats, which are found throughout the state, lynx are denizens primarily of subalpine forests. Lynx populations fluctuate in synchrony with their major prey, the snowshoe hare.

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50 and 70 square miles. In regions where food supplies are stable, bobcat movements are usually less than 30 miles. In this study, one ear-tagged male juvenile, presumably tagged within its mother's territory early in winter, traveled 69 miles, from Thompson Falls to Lolo, in 11 months. Another juvenile, a female, established her territory just next door to that of her mother.

We were interested in determining whether yearling females had kittens or not. We radio-monitored a few yearling females originally caught as kittens, and none denned their first summer. Of the five females 2 years old during denning season, only one had kittens. Most adult females had kittens or at least displayed denning-like movement behavior even if we did not find kittens. One exception was an adult originally caught in 1981. She raised a kitten in 1983, but not in 1984. This may have been because of her advanced age (she was probably at least 5 when first captured) and deteriorating physical condition.

Harvested cats give clues about reproduction

Reproductive rates are important in determining the productivity of an animal population. Litter size provides some indication of how rapidly a population can replace itself, but it gives us only part of the picture. We wanted to determine (1) at what age bobcats first became reproductively successful; (2) what percentage of females in each year-class conceived and produced young; and (3) how many kittens survived until adulthood.

To learn more about age at first breeding, litter size, and ovulation rates, I used a sample of 585 legally harvested bobcat carcasses collected throughout the state from 1979-83. I was primarily interested in yearlings since they comprise the largest segment of the bobcat population. If females breed when they are only a year old, this would add a significant number of animals to the population each year.

We determined age by cross-sectioning the large canine teeth, something impossible to do with live-captured animals. (Age is determined by counting the rings of cementum; one layer is laid down each year, much like growth rings on a tree.) We correlated ages with what we found in the reproductive tracts. Placental scars mark points where kitten embryos were attached to the mother's uterine wall. They show how many kittens a female (harvested in winter) may have produced the previous summer. One must regard this figure as a maximum number, however, because it gives no clear idea of how many survived after birth.

We found that litter sizes in Montana ranged from one to six, and averaged roughly three. This confirmed field observations of litters of two or three kittens, and agreed with research conducted throughout the bobcat's range.

Information from bobcat carcasses indicated that yearlings produced fewer offspring than older animals. Fewer yearlings conceive, and those that do average fewer kittens per litter. Although females may be capable of having kittens their first season, very few do, and only a small proportion of those able to breed their second year produce offspring.

Harvest data indicate that nearly two-thirds of the population was less than 2 years old during the breeding season. Since most bobcats are at least 3 years old when kittens are born, a relatively small proportion of the female population is responsible for perpetuating the population.

How does management come in?

As we had guessed, bobcats were not having more kittens in eastern Montana than in the west. Differences in these population levels must be linked to habitat quality and kitten survival after birth. The prairies must support a greater supply and variety of prey than the western forests. Bobcat harvests are managed with this difference in mind.

Because of their low reproductive rate, small average litter size, and relatively high mortality rate, bobcat populations probably cannot sustain heavy harvest pressure. A study conducted in the sage desert of southeastern Idaho by Dr. Steven Knick, a former Ph.D. student at UM, illustrates an important point. He studied a bobcat population where trapping did not occur. He found that annual survival rates were lower in the adjacent area where bobcats were harvested than in the unharvested reserve, and his research concluded this difference was attributable to trapping pressure.

There were more yearlings in the harvested area than in the unharvested area, suggesting that fewer bobcats were surviving to reproductive age. He also found that additions to the harvested population came primarily from young immigrating bobcats. Without a constant flow of cats from unharvested areas, the harvested population would decline.

When I analyzed the female harvest of bobcats from both western and eastern Montana for 1980-83, I found that 68% of the animals harvested were between six months and 2-1/2 years old, suggesting heavy harvest pressure. If we apply the results of Knick's work to this, we may wonder if enough bobcats are surviving to sustain the population. Untrapped areas exist in unroaded areas of Montana, particularly in the western portion of the state, and some areas are closed to hunting. Managers need to be aware of this need for untrapped areas on both sides of the divide to ensure that bobcats can continue to be harvested and enjoyed by the public.

The specialized lynx

The lynx is very much a northern animal, well adapted to its forest environment. It ranges throughout northern Canada, Alaska, and in isolated subalpine pockets as far south as Colorado. Lynx have never been common in Montana, occurring primarily in the subalpine areas of the Rocky Mountains. They are also occasionally reported in the prairies of eastern Montana, usually after Canada's hare populations have crashed, forcing the lynx to range farther in search of prey. Lynx remain in subalpine habitat throughout the year, but make excursions into surrounding valleys during winter.

The lynx is roughly the same size as the bobcat, with adults weighing between 18 and 35 pounds. Adaptations such as outsized "snowshoe" feet and proportionally long legs enable the lynx to survive in areas with deep, soft snow.

Snowshoe hare specialist

Throughout Canadian and Alaskan boreal forests, lynx and snowshoe hare populations cycle in synchrony with one another. During the peak years, researchers in Canada found that hare populations reach 6,400 animals per square mile; during low years, they found only about four per square mile. Concurrently, researchers found about 16 lynx per 100 square miles during the peak, and three to four lynx every 100 square miles after the decline. Hares increase rapidly after declines, because their food, such as willows and other shrubs, rapidly regenerates. Hare reproduction overshoots the food supply, and they then literally eat themselves out of house and home, dying off in large numbers. Predation pressure by lynx and other carnivores pushes the hare populations still lower. Lynx reproduction is thus geared to the hare cycle, and pregnancy rates and kitten survival are much lower during hare lows than during peaks.

Record movements

Lynx are capable of making some rather astonishing movements in response to snowshoe hare population crashes. Researchers in Canada and the northern United States have reported movements from 60 to 430 miles, and an adult female lynx in our study covered 195 miles, from the Thompson Falls area to near Radium Hot Springs, British Columbia, where she was caught by a local trapper. She was in good condition when she was harvested, and must have been finding food along the way. A male lynx traveled 58 miles in about a month, from Chamberlain Creek in the Blackfoot drainage, to near Lolo.

Home range versus prey density

In 1981-82, snowshoe hares in the Garnet Range study area were at their lower densities, and home range sizes for four radioed lynx in this area were correspondingly large, indicating these animals had to go far afield to meet their food requirements. Researchers have found that during snowshoe hare lows, the remaining hares concentrate in small patches of remaining good habitat. In order for a lynx to gather enough food to survive, his home range would necessarily encompass several such pockets, which may be spaced well apart. As hares increase, the lynx's range decreases, encompassing those patches with the most hares. In addition, we observed a high degree of overlap of radioed lynx home ranges, regardless of age or sex. It appears that lynx do not defend territories when resources are sparse and instead concentrate on these small patches.

Home ranges for two of the male lynx in the Garnets were 89 and 60 square miles, respectively. During the next two years, the home range of the one male still remaining in the study area decreased from 60 square miles to 19 square miles, apparently in response to increasing snowshoe hare numbers. Two females monitored in the same area during 1982-83 had home ranges of about 17 square miles. Snowshoe hare numbers were still relatively low at the end of the study, however, and two radioed lynx emigrated out of the study area and two motherless kittens starved during this period. Snowshoe hare numbers have steadily increased since the study ended, and lynx numbers have also increased within our old study area, according to track counts conducted by the FW&P from 1985 to 1989.

Interaction with bobcats

Our research was the first to document direct interactions between lynx and bobcats. Home ranges of two lynx and one bobcat, all adult males, partially overlapped. As expected, we found that the bobcat used lower elevations and the lynx occupied higher subalpine areas during winter. During spring, the bobcat moved higher into the mountains, and 90% of its home range overlapped with the two lynx ranges. During spring, summer, and fall, when these species occurred together, they seemed to actively avoid each other. The fact that bobcat and lynx can coexist in close proximity and yet rarely meet may be due to scent-marking behavior typical of both species. Both leave feces and urine as "calling cards" to announce their presence.

More research needed

Lynx occur in isolated pockets in western Montana, and only rarely wander into eastern Montana, usually as long-distance dispersers from Canadian populations. FW&P offices in Kalispell, Missoula, Bozeman, and Great Falls report lynx harvested every year, but in recent years, harvests have declined, according to Hash, FW&P's statewide furbearer biologist. Reasons for this are unclear, and illustrate the need for a goal-directed lynx research study. The information we have gathered to date was coincidental to other ongoing projects, and the lynx deserves a long-term study of its own.

FW&P's management commitment

Through our research, we learned something about bobcat ecology in western Montana, and learned a bit about the lynx as well. FW&P is committed to sound management of both of these small wildcats and continues to gather information on population trends through harvest data, trapper interviews, and research. Quotas for bobcat harvests have been conservatively set to ensure both trapper opportunity and the continued well-being of the bobcat. Lynx harvests are generally low, since most are trapped incidental to other species. Intensive studies of food habits and prey availability will further our knowledge of the dynamics behind population fluctuations. At present, bobcat populations appear to be slowly increasing in western Montana. Lynx were probably never abundant in the state, and occur in isolated remnant populations. Continued conservative management of both species will ensure their important role in the mountainous regions of Montana.

* * * * *

"What do you mean there are no bobcats around here?" I said to the white-haired man who was sitting in the warm comfort of his four-wheel drive, as I stood on the side of a mountain road. With my hand-held radio-tracking antenna, I pointed at the brushy streamside vegetation off the side of the road and said, "Why, there's one right here!" Indeed, a radio-collared female bobcat was hunting along the stream only about 300 feet from where I stood, and I could see her fresh tracks in the snow where she had just crossed the road.

"No, can't be," the man replied. "I've lived around here for 30 years and I've never seen hide nor hair of a bobcat."

I explained to him that we had marked several bobcats in the surrounding drainages the winter before and he just stared at me in disbelief. "Ain't no bobcats around here," he grumbled, and drove off down the slush-covered dirt road.

I laughed, shook my head, and took a reading on the animal before I, too, got into my truck and headed to my next cat. I could understand why the man had never seen a bobcat, though. I had been within a few yards of radioed cats several times over the past year without seeing "hide nor hair." Secretive, elusive, shy—these words all describe those small Montana wild cats, the bobcat and the lynx.■